# AMATEUR TELEVISION MAGAZINE

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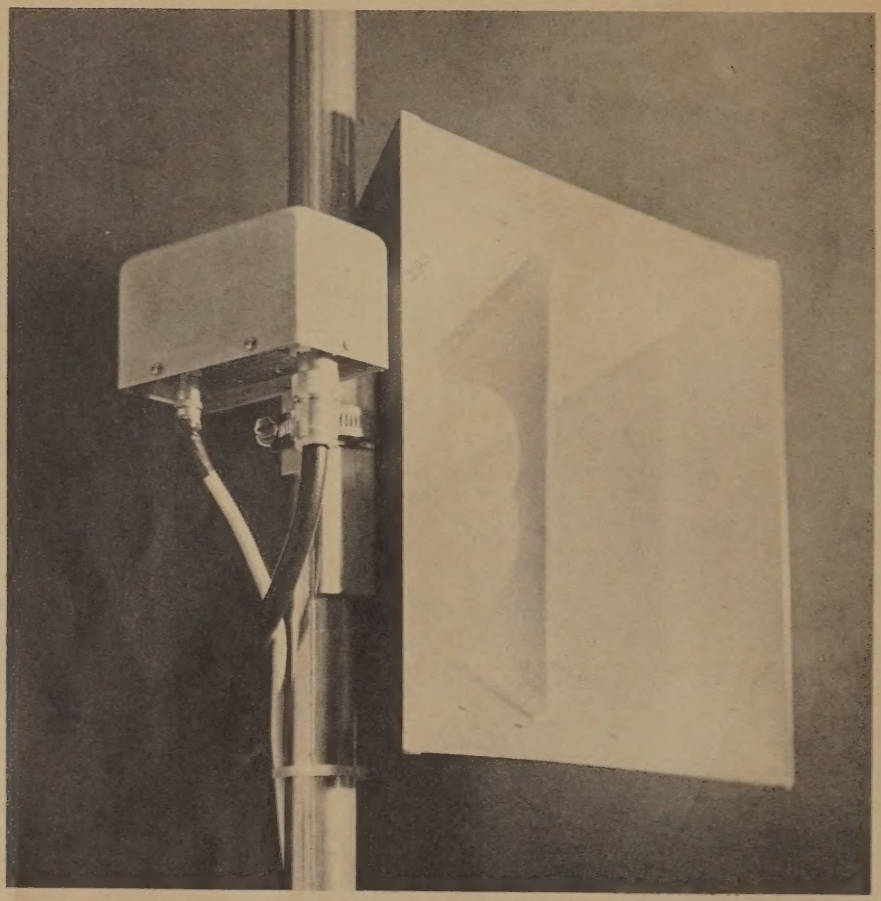
SSTV CERTIFICATE "MASTER SCANNER AWARD"

# MDS RESIDENTIAL DOWNCONVERTER

MAGIC LANTERN TELEVISION



- 3 STAGE PRE-AMP
- SIMPLE INSTALLATION
- UHF OUTPUT
- LOW COST
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The downconverter contains the same three stage microwave preamplifier found in Global's MATV type unit widely used in MDS systems. This results in an excellent noise figure giving good fringe area reception with lower cost antennas and masts. The companion power supply is a regulated unit having a tuning control to permit adjustment under extreme temperature conditions. It also contains provisions for incorporating a controll function to prevent reception of daytime business programs.

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Order from: MAGIC LANTERN TELEVISION
Box 221
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Mfg. by: Global Systems Corp.
15 Hale Street
Haverhill, MA 01830

Mail order price for the downconverter and power supply ready to install is $110. Model 17TH Tuned Horn Antenna is $32.00. A 24" RG214U Jumper Cable with N fittings, Model 24JC is $13.00. Model 20P two foot solid parabolic antenna is $135, and Model 24P four foot grid parabolic antenna (24 dB gain) is $200.00.

For further information, call Douglas D. Milne at MAGIC LANTERN, (617) 369-1834.

DEVOTED TO HAM TV

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# Amateur Television Magazine

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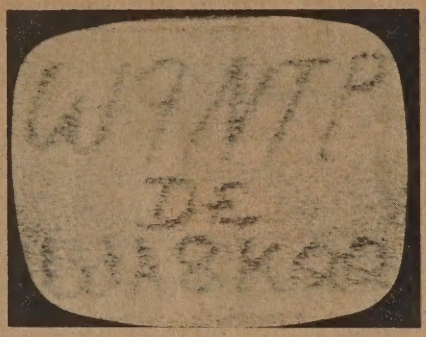
## NEWS AND OTHER STUFF

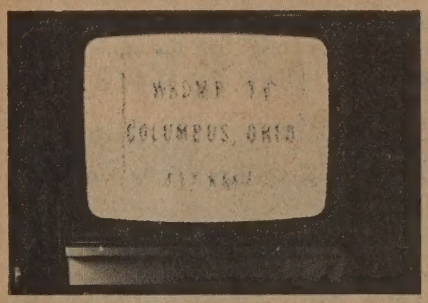
NEAT ON THE AIR. That's New England Amateur Television, not a comment on the condition of your shack. Tony, K1VTE informs us that the Boston area now has their signal on the air after a long uphill struggle. Presently operating under the call sign of K1VTE/RPT from Malden, MA, about five miles north of Boston, they are transmitting a test signal on 439.25 from 6 PM until 2 AM everyday. They are using the Aptron AX-10 of WA1FTA's until their own arrives, tuned on 427.25. The antenna is presently a Phelps Dodge station master aprox 325 feet above sea level. A second station master will go up soon for the receiver. TX power is 12 "little" watts and signal reports are P3 to P4 from 25 and 30 miles away. They will soon have 300 watts and expect to have real DX then!

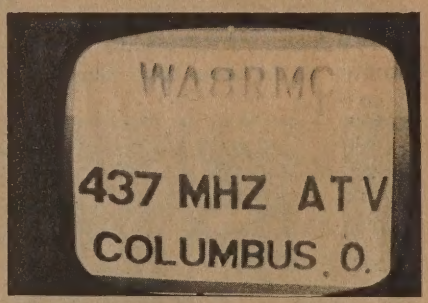
Roger Bonnett WB9NOE and several other ATVers of central Indiana put on a public demonstration at the Marion Mall in Marion, IN. In addition to ATV, the group had other more conventional forms of ham radio on display and many folks stopped by expressing interest in becomming hams. Roger is the EOC as well and is interested in using ATV for a link between a site of a disaster and EOC HQ.

POLY PAKS has been offering a sideband filter for ch 2, 3 for $2, which could be used to trim off your lower sideband of your video signal. You could then up convert add some power and provide a high quality VSB TV signal. Anyone using this system yet?? Poly pak stock number is 92CU3975. The unit is in a TO-8 size case, and uses the new surface wave bandpass system.

DX has been chasing ATV around for years. This year has been better than most. The real story is in the 1/4 watt QSO between Bill Parker W8DMR and Don Miller W9NTP. About 150 miles without aid of a mountain, airplane or baloon! Don sends these DX photos of Bill and some other weak stations (hi) WA8RMC was using about 50 watts and was snow free as the pictures show.

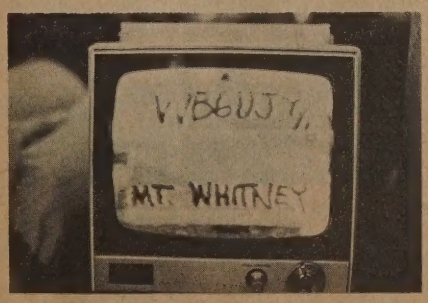


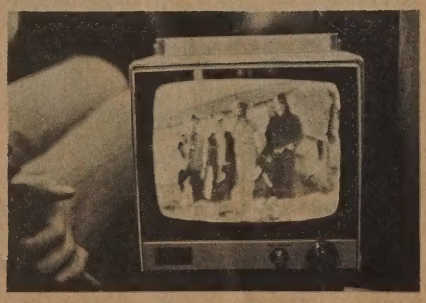





**Bill says he was flabbergasted when Don told him his 1/4 watt signal was clearly visable. Don't doubt that at all.**

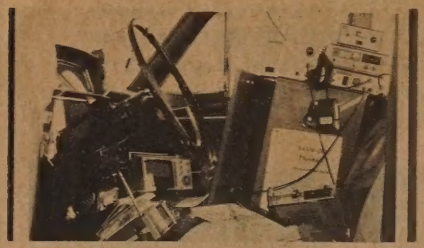
**Now if a Mountain is handy, it's no reason to let it stand idly by. Thad conquered Mt Whitney for ATV in 1975 with his portable 10 watt station and battery pack. These pix were pulled in from about 150 miles away. Not only is there snow in the picture, there is SNOW in the picture!**



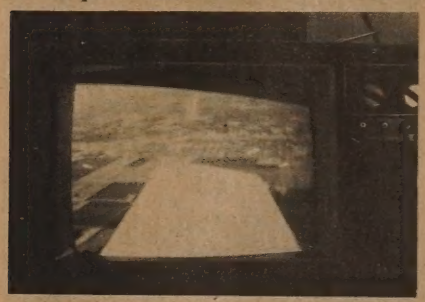



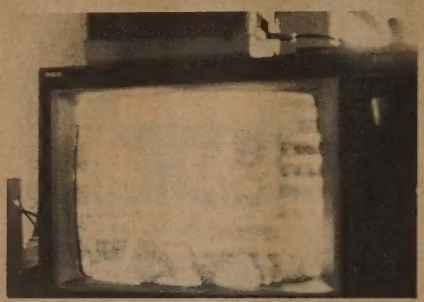
**Now mobile TV has always caught my fancy, as anyone who has seen ATV in a Nutshell can tell! Once again, the California boys come up with some fancy stuff.**

Ernie WB6BAP shows us his mobile shack, stuffed with all sorts of equipment in the first photo, and an overall (above all too) view of his mountain top mobile operation. I'm not sure how the DX 420 antenna is mounted, from the view it looks like its on the front bumper! In any event, mountain topping can be fun!



For those of you who like to get above it all, you can with ATV, as many have in the past. Airborne ATV is not new, a lot of you have tried it, including some





COLOR transmissions from the gang in Ontario. Here's a look out the window and at the instrument panel as the ATV bunch fly around the San Deigo ARRL convention. Transmitting antenna was a 1/4 wave wire in the window, receive antenna was a ringo on the top of the meeting room at the convention hotel.

Public demonstrations are always fun, usually because everyone who walks by tries to find the camera, and it's fun to watch them try and find it. A camera positioned on the opposite side of the isle looking at the exhibit with a monitor in front will attract folks since they see themsleves but can't see the camera and monitor at the same time. Here is how the set up looks at one SCATV public demo in LA.

Operation Santa can take on new dimensions when live video is added. Here Ernie is checking the camera on a local monitor, as well as video taping the program for later review as he and other members set up a roving Santa receiver in various areas of the hospital to receive the pictures from "the north pole". Two way TV allowed the children to converse with Santa, a hospital employee who was familiar with the patients and could refer to them by name. Needless to say, any snow in the picture only added realism to the scenario.

The magic word for all this activity is to be prepared. Carry extra items so you needn't go back, or sit in disgust if it's too far to go back. Nothing is worse than to have your camera or monitor die just as you set it up. I've had a perfectly working brand new TV crap out "on location" and was saved by pulling the mobile TV from the car at the last moment. Plenty of extention cords and junction boxes. While they will always tell you there is plenty of AC about, it is usually nowhere near. Public malls and such also demand a little extra neatness and courtesy. Tape your cords and cables so folks don't trip over them. Bring some folding chairs to sit on during the slow periods. Have plenty of help. You will need to take a break once in a while for food or the cat box, and would you leave your TV goodies alone?

Prepare a small handout. A single sheet of info which details in general terms what you are doing, who the sponsoring club is, where the interested person can get more info. Include club meeting time and place, or a contact number. List the ham publications which the viewer could purchase for more info. If you are showing HF gear, have some extra pieces for "hands on" use and the working station for the folks with a license. A CPO and hand key can be used to get the kids going. A lot of children learn the code as part of Scouts or other

**(continued)**

**Besides climbing on top of mountains, you could climb on top of buildings. Here is the portable set up used to telecast a parade. A cooperative store owner was contacted in advance and the crew set up well in advance for a trial telecast, then came back a few days later for the real thing.**

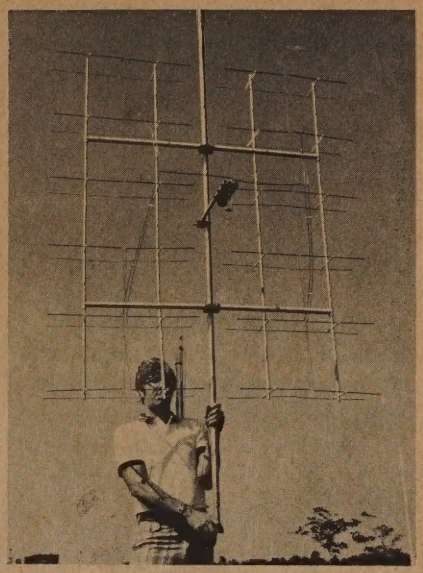
activities, and can then be encouraged to "try their hand" at sending a prepared message (i.e., Ham radio is fun for all). A prize, such as a certificate to the "key Holders club" or other inexpensive item could then be handed out to those who successfully send the short message. Needless to say, your club info is on the certificate also.

If you have the funds in the club treasury, or a cooperating ham store, you could have some publications on hand for the serious investigator. A copy or two of the ARRL novice kit, Q and A book code tapes, or what have you which you could then sell should you have a hot prospect. Since most of the malls have rules governing selling, you should check with the mall manager before you offer these tiems. Most will allow it since it is ancillary to your demonstration and not in competition with other stores in the mall.

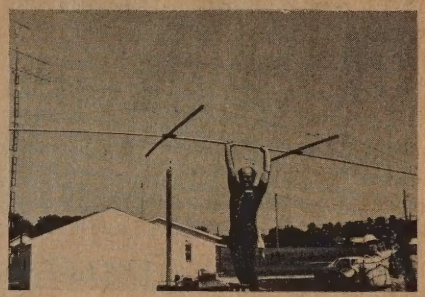
It seems most clubs have at least one sour apple who doesn't provide a good public image. Tell them to stay at home. You need your best foot forward, and an abrasive personality will not help your image. Pick your best PR minded members. Those who do not feel comfortable dealing with the public can always help set up and tear down the exhibit, contribute extra goodies, print the hand outs, prepare publicity and make posters . . . .

Try and schedule precise demonstration times for your ATV operations. A little toy clock with movable hands and a card which says, "NEXT DEMONSTRATION AT:" will allow your potential audience to shop and then drop by for the "action" rather than miss the activity. A club banner or poster should have a prominent part of your display. Include the meeting time and place as well as other non technical features of your club (meets twice monthly, other regular functions). Do you or your club have any awards? Now is the time to display them. Hall out your Public Service awards, plaques, etc. Set up an award table or shelf behind the exhibit where everyone's awards can be displayed.

Don't forget to take some pix and send them to A5. Everyone else would like to see your efforts also!



**Art, WA8RMC and his lightweight 48 ele. colinear.**



**Charles, WB8LGA and his dual rhomboid.**

## AN ATV ANTENNA PARTY #

September 24th dawned clear and cool and by 10:00 am ATV'ers were arriving at the QTH of WB8LGA near Mt. Gilead, Ohio (30 miles north of Columbus) for the annual 1978 ATV antenna party. Yagis, colinears, rhomboids, corner reflectors and even a discone were carefully removed from trailers, car roofs and trunks and laid on the freshly mowed field near Charles' home. Bill, W8DMR, even managed to tie a 20½' yagi on his sedan. Chuck had his 20' boom rhomboid there, a W8DMR design for 437 Mhz.

Charles had hooked up a system whereby a Singer Generator #6202 pumped a low level signal (2 V. max into 50 sz) into the antenna under test. Some 100 feet away a **pickup antenna*** was fed into a wide band preamp and the results fed thru coax back to the RF voltmeter (Boot-on #92BD) and chart recorder (Moseley Autograf 7050A). A **test dipole*** was used to verify the reference point after each measurement.

Although 437.5 mhz was used as the test frequency, antennas were **frequency swept*** for maximum gain to assure owners of true resonance.

Art, WA8RMC, brought the star of the show; a new 48 ele. colinear (19.5db). Art's clever construction featured total use of plastic water pipe and nylon rod for mechanical support. The only metal used was the vertical mast and actual electrical elements. Extremely light weight, low wind resistance and a clean, balanced forward pattern were the more obvious results.

Sid, K8ZES, arranged the picnic style lunch as cooked by Merle, his 12 year old harmonic. Dave, WB8AUK, supplied film and photo gear for recording the event.

Participants included: WA8JLB - Jack; WA8RMC - Art; K8ZES - Sid; WA8GYP - John; W8DMR - Bill; WB8EDO - Earl; WB8MNL - Willard; WA8QQU - Bob; K8HVA - Guy; WB8LGA - Charles Beener.

Measurements Results were as follows:

| | |
|---|---|
| Dual Rhomboid by WB8LGA (W8DMR Design) | 20.odb |
| 48 ele conlinear by WA8RMC | 19.5db |
| 26 ele yagi by W8DMR | 17.0db |
| 32 ele colinear by K8HVA | 16.5db |
| 11 ele commercial yagi - WA8GYP | 10.0db |
| Military discone (AT-197A/GR) held in horz. plane - WB 8MNL | 8.0db |
| Corner Reflector by W8DMR | 7.0db |
| 6 ele colinear by W8DMR | 7.0db |
| Mini-wheel by K8ZES | -2.0db |
| Standard dipole | 0db |

*3 element Yagi, not broadbanoed, response of this antenna must be taken into account.

* **Plot** of standard or reference dipole not shown at party.

#**Not a Contest**, but a party.

JIM W7BLO writes to say that ATV is alive and well in Seattle, WA. They have an ATV net on Tuesday night at 8 PM (local) on the 147.80-.20 rpt. Simplex video is on 426.25 Mhz. Their major efforts are to get 4.5 Mhz subcarrier audio and gather enough to start construction of an ATV repeater. They have been holding demonstrations at hamfests throughout the pacific northwest area to gain support and more activity. They would like to see some articles on subcarrier sound and receive preamp projects. OK home brewers, send in some goodies.

Classified ads are FREE to subscribers. Clean out your old ATV gear now!

WB4EFZ, Jack in Greenville, SC writes to say that there is quite a bit of interest in ATV in the NW corner of SC. He and N4JK are exchanging pix with several others in the building stage.

K5ROV, James of San Angelo, TX writes to say that he would like to buy an older ATV station, all except camera and TV receiver. He will accept home built or converted equipment but does not want any of the new commercial gear. Jim as been on ATV quite a bit, but has not been active for the past 10 years and is getting started again. Contact Jim at 3113 Edgewood Dr., San Angelo, TX 76903.

In Jack WB4EFZ's second letter, he says that there is serious talk about an ATV repeater on a 3900 foot mountain in his area. In addition, four more folks are operational on ATV with more waiting to see how things work.

For Sale: Regency HR-440, with video modulator $200, also Sylvania zoom lens, approx. 25-100 mm, C mount. Needs minor work on iris (won't close all the way, but first five F stops OK) $50, Shibaden reel to reel video tape recorder 1, complete, 1 less heads, portable record unit, camera, msl items several rolls of tape, Panasonic monitor, books. $150 for all. mil surplus but clean TS-226A/AP, peak reading wattmeter. Measures your peak power (sync tip in TV) to 1,000 watts. $50. 108' Heights AC-18 tower, new top, rotor plate, some guy hardware, all tower bolts. On ground good shape. $650. Will also trade for low band gear, prefer TR4 (any version) or Drake twins. Also, BIRD 50 D element $25, 500' RG58, $30, 100' RG-11 $15 Henry WB9WWM, all items open for bid.

GET A BUDDY ONTO ATV PROGRAM

In addition to PC Electronics discounts on multiple units of their gear, A5 will help also. If, you get a friend to subscribe, when you subscribe or renew, your friends new subscription is HALF PRICE for a 1 yr, and $3 off any multi-year subscription. ATV IN A NUTSHELL, buy 1, get a second for your buddy for only $3 more, no limit on additional copies ordered at the same time. So, 1 copy, $5, 2 copies $8, three $10 etc. PLUS POSTAGE. THESE SPECIAL OFFERS ARE ONLY GOOD UNTIL MAY 1, 1979. Any orders received after that time will be billed at the regular rates.

LIFE SUBSCRIBERS are 20x annual $130.00.

Next issue: a 100 watt ATV amp that's easy and cheap and is conduction cooled!

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## LIMARC ERECTS ATV REPEATER ANTENNAS AT NEW SITE

On Sunday, November 5, 1978, 2.5 watts average power (10 watts peak) were sent from the new LIMARC ATV site in Syosset, New York. Pictures were received by W2RFU at Lawrence, L.I. (20 miles), WA2PZO at Bethpage (6 miles) and WB2AQM, New Hyde Park (12 miles).

This transmission culminated five weeks of work by a dedicated crew of more than 25 LIMARC members and friends. During LIMARC's shining hours over the weekend of November 4th and 5th, three ATV antennas were erected on a 300 foot tower. The highest of the antennas is 500 feet above sea level. The primary service area will be all of Nassau County and the western part of Suffolk County. Since November 25th a ten watt peak TV beacon has been sending out a video signal and a five khz deviation sound signal of 439.25 mhz from 18:00 to 20:00 EDT to test propagation from this site. Reception reports have come in from as far away as New Haven, Conn. (W1NRE, 35 miles) and Red Bank, N.J. (W2JHY, 45 miles).

It is planned to commence regular operation before the middle of January 1979. Some of the publid service programs being planned include an interactive audio/video course in amateur radio. This will be sponsored by the Syosset High School radio club (WA2JAS) in conjunction with the Port Washington School District radio club (WB2JNQ) at the Schreiber High School. Other high school radio clubs will be invited to observe and listen in. Also planned is a course in computer science to be given by W2LLB who is a professional in the data communication field. An additional feature will be the renewal of the LIMARC Technical Net which will now provide a video signal as well.

The LIMARC ATV operation is planned to be an ongoing demonstration of the benefits of low cost interactive audio/video telecommunications for education as well as public service in the community.

Ed Piller, W2KPQ
Chairman, LIMARCH ATV Committee
80 Birchwood Park Drive
Syosset, New York 11791

The technical standards for the LIMARC repeater transmissions are as follows:

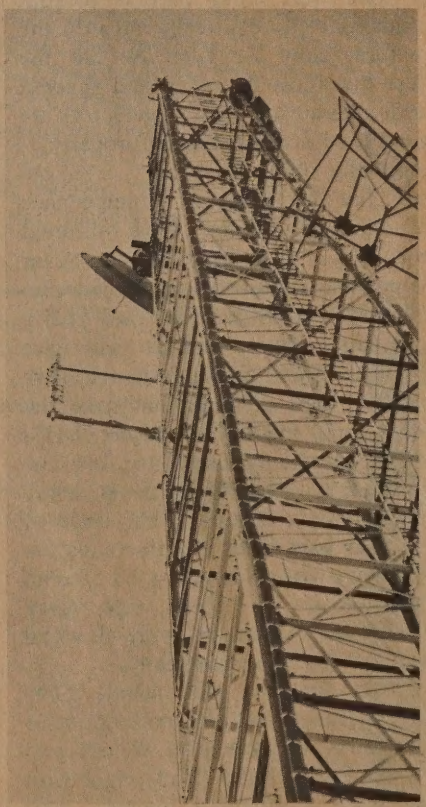
| | |
|---|---|
| Transmit video | 426.25 mhz upper vestigial sideband |
| Transmit audio | 430.75 mhz (25 khz deviation) and 426.25 mhz (5 khz deviation) |
| Receive video | 439.25 mhz upper vestigial sideband |
| Receive audio | 439.25 mhz (5 khz deviation) |
| Polarization | Vertical |
| Power | 100 watts ERP picture, 80 watts sound |
| Pattern | Omni-directional elliptical, major lobes east and west |

LIMARC antenna installation crew. (L to R front row) WA2SKV, W2TRP, N2AOI, K2MZ; (Rear) WB2CUK, NSFP, WB2KCD, K2UDT, W2KPQ (Chairman ATV Committee), KA2CLQ, WN2VVR, W2MVS, WB2RYC and WB2SDG. Photo by K2JKX.

Jack, WA8JLB, mounts the 11 ele yogi.

Lisa, daughter of WB8LGA; Charles, WB8LGA; Art, WA8RMC; Merle, son of K8ZES; Bill, W8DMR; Earl, WB8EDO; Darren, son of WB8LGA; Bob, WA8QQU; Willard, WB8MNL.

N2FP at left transmitting pictures during antenna tests. WA2SHC (Selma), handling communication control to tower and 25/85 repeater. Photo by W2MVS.



LIMARC ATV antenna on outriggers at left is 500 feet above sea level. Photo by W2MVS

## RESULTS OF THE SO. CALIF. ATV CLUB ANTENNA MEASURING PICNIC

All measurements are gain with respect to a reference dipole 10 feet above ground. Frequency was 434.0 mHz. Equipment accuracy is ± .5 DB plus W6ORGs eyeball'

| CALL | ANTENNA TYPE | GAIN DBd | NOTES |
|---|---|---|---|
| WA6MVD | Homebrew 15 el QUAGI | +14 | without balun +12 db. Beamwidth 10deg H & V |
| WB6TOC | Homebrew RHOMBOID | +14 | Horizontal. 5 deg BW |
| W6QDP | Homebrew 16 el COLINEAR | +13 | with balun. BW 15H, 30V |
| K6ZSR | Dual Cushcraft DX420 | +12 | no balun. BW 15 H, 10 V |
| WA6IGY | KLM 14 el YAGI | +11.5 | BS 15 deg horz, 30 Vert |
| K610N | Spec. Intl. 48 el skel slot | +11.5 | corrected for 60' coax |
| WA6SVT | Homebrew 12 el COLINEAR | +11 | BW 20 deg. H, 30 Vert. |
| WB6BAP | Cushcraft DX420 | +10 | no balun |
| WB6ZPN | Cushcraft 11 el Yagi | + 9.5 | |
| WA6CAS | Cushcraft 11 el Yagi | + 9 | BW 30 H, 20 V |
| W6ORG | Cushcraft 4 Dipole Omni | + 4 | |
| WB6BAP | Homebrew ground plane | - 1 | FROM BELDEN CATALOG: |
| WA6OFO | Radio Shack Corner Refl. | - 4 | Loss at 400 mHz per 100' |
| | | | Mil RG 8 4.7 DB |
| | | | 8314 foam 3.8 DB |
| | | | RG 58C/U 12.6 DB |

### Some Conclusions

1:1 50 ohm baluns on Quagis and colinears make up to a 2 DB difference. Connector construction and weather proofing is very important. K60INs Skeleton slot should have measured the same as W6YFTs did a few months back at 14 db but he had a bad type N connector. Smog particle pickup, oxidation, etc. can really cut into the picture snow %. Type Ns are the best but must be taped and sprayed with **clear**epoxy. UHF connectors are good too but must be made properly... especially tining the briad . . . see below. The idea is to keep the impedance 50 ohms. If you don't have full braid coax and if it doesn't continue as far as possible to the edge of the inner insulation cut then there will be a impedance bump which will give loss and VSWR. Ns are more expensive but by their construction make the braid go all the way to the cut. UHFs made right are just as good at 434. Use continuous runs of doax as many adaptors have bumps. If the braid of the coax gets water in it the oxidation will cause you to have a good 50 ohm dummyload . . . spray, tape, spray again twice. Clean and spray all metal to metal antenna connections.

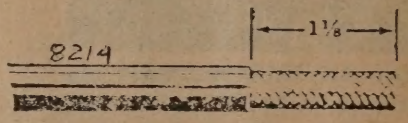
Next time we will include 1200 meg antennas, and give more notice so that more can participate. We'd like to try the F9FT (Tufts 73 ad) which won the VHF Conference contest. Also WA6CSMs 48 element colinear.

73 TOM W60RG

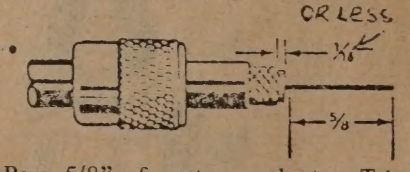
### Assembly of Cables To 83-1SP Plug (PL259) AMPHENOL

COUPLING RING

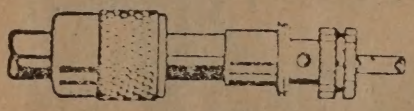
PLUG SUB-ASSEMBLY




Cut end of cable even. Remove vinyl jacket 1 1/8".




Bare 5/8" of center conductor. Trim braided shield. Slide coupling ring on cable. **Tin exposed center conductor and braid.**



Screw the plug sub-assembly on cable. **Solder assembly to braid through solder holes.** Use enough heat to create bond of braid to shell. Solder center conductor to contact. For final assembly, screw coupling ring on plug sub-assembly.

## NEWS RELEASE

On December 10, 1978 from 8:00 to 9:00 p.m. and from 10:00 to 11:00 p.m. the NEAT Group (whose exhibit you may have seen at the recent Boxborough ARRL Convention) transmitted a one-hour video tape showing a tour of the ARRL Headquarters in Newington, Connecticut, given to K1VTE and W1BHD on December 5, 1978.

The NEAT Group ATV Repeater in Malden, Mass. transmits for circuit adjustment purposes a test pattern from 11:00 a.m. to 1:00 p.m. and from 7:00 p.m. to 8:00 p.m. each day. The pictures are being seen by many amateurs in Eastern Mass. NEAT Group pictures can be received (439.25 input, 439.25 output) on any TV set with a partially homebrewed or commercially built converter for under $50.00.

For more information write the NEAT Group, P.O. Box 307, Peabody, Mass. 01960, enclosing a self-addressed stamped envelope.

THE NEAT GROUP
WA1RRK

## NEWS RELEASE
## NEAT GROUP ATV

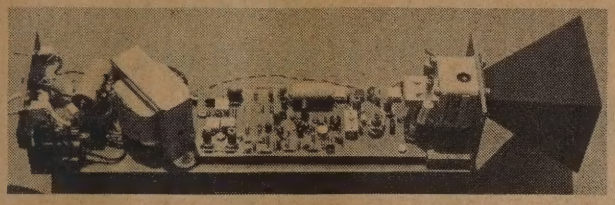
The New England Amateur Television Group is presently transmitting through the NEAT Group ATV Repeater, input 439.25 Mhz and output 427.25 Mhz, with on-channel and off-channel audio capabilities.

The NEAT ATV Repeater is the only active ATV repeater in New England and is temporarily operating at the site of the 19-79 Repeater Association in Malden, Mass., with hopes of locating a permanent site at a higher elevation of 600 to 1,000 feet. One hundred watts (soon to be increased to 400) are transmitted to a 10 DB gain antenna 400 feet above sea level, and 30 feet below is the receiving antenna. Use of the repeater extends to approximately a fifty mile radius of the site, depending on the equipment available to the user. Pictures are being received by numerous stations in Eastern Massachusetts. The test pattern shows the time, the outside temperature and the NEAT Group logo and is transmitted for

**(continued)**

# This Month's Kit

Low-cost do-it-yourself microwave. The famous CATJ Lab developed 'Mini-Wave' GunnPlexer video plus audio transmission system as detailed in the June and July (1978) issues of **CATJ**, and as also featured on the front cover of **Popular Electronics** (October 1978) with a second part in the current (November) issue of **PE**.



Everything is here except the pair of Microwave Associates GunnPlexers (with the kit we tell you where to get rapid delivery of these units). The housing, the circuit boards, the parts. PLUS—you also receive instructions for assembly and alignment, and we give you sources for 2-4 foot parabolic antennas should you require more range than the 17 dB gain horn antennas offer. **An exceptional value for experimental microwave work**—puts you on the air with both a 15 mW transmitter (transmits baseband video—such as 1 volt peak to peak—**and** audio) and a high quality receiver (delivers 1 volt to peak video—in full color—and 600 ohm audio). If you have been wanting to work with your own low-cost microwave equipment, this CATJ KIT makes it possible! And if you want video only (for surveillance, etc. purposes) **a video only kit** is also available. PLUS—you have the backup of the CATJ Lab should you run into assembly or operation problems. This Kit is an exceptional buy for the CATJ system operator.*

**PRICE**—KIT MW-10 (video and audio), receiver and transmitter—$187.
KIT MW-10V (video only), receiver and transmitter—$147.

***—Equipment operating frequency determined by the GunnPlexer you order; typically 10 GHz region in FCC amateur or experimental assigned bands.**

# CATJ's Kit Korner

The CATJ **'KIT KORNER'** brings to the cable television industry a **selection** of 'do-it-yourself' **construction kits** offering you the opportunity to expand your own knowledge of CATV hardware and systems; and to add to your own system's operational versatility the advantage of state-of-the-art equipment. Kits offered through 'Kit Korner' are **backed up by the CATJ Lab** where you can obtain trouble shooting and de-bugging assistance (if required), at very nominal costs.

**Each kit offered** through 'Kit Korner' has been developed in the CATJ Lab, or by a CATJ reader who has submitted the project as a construction article in CATJ. **The CATJ Lab refines projects** by supplying all parts, circuit boards and alignment instructions as required. . .to insure that your kit building experience is both troublefree and educational. Readers with a construction project of their own who would like to see their construction project 'published' and offered to the worldwide CATV industry through 'Kit Korner' should contact CATJ editor in chief Bob Cooper for details of this program.

**Future 'Kit Korner' projects** will include TVRO receiving modules, CATV test equipment, test and work bench 'time-savers' and do-it-yourself low-cost plant and headend equipment for very small (rural, low density) CATV systems. The CATJ 'KIT KORNER' is your **one-stop source** for CATV learning aids. . .you learn by doing and you have the long term benefits of on-going use of the equipment you build yourself through 'KIT KORNER' projects!

**GREAT FOR ATV LINKS, REPEATER LINKS, FM VIDEO EXPERIMENTATION, DOZENS OF OTHER APPLICATIONS**

**KIT KORNER ORDER FORM**

_____ **$187 ENCLOSED**—please send to me (postpaid) one complete Mini-Wave transmitter and 1 complete Mini-Wave receiver kit (less GunnPlexers), model MD-10 (video **and** audio).

_____ **$147 ENCLOSED**—please send to me (postpaid) one **video-only** Mini-Wave transmitter and one **video-only** Mini-Wave receiver kit (less GunnPlexers), model MW-10V.

**Ship to:**

NAME _____

Company (affiliation) _____

Address _____

Town/city _____ State _____ Zip _____

Enclose payment with order to:

CATJ KITS
BOX 1347 BLOOMINGTON, IN 47402
(U.S.A.)

CATJ's KIT KORNER

(continued from page 6)

adjustment purposes from 11:00 a.m. to 1:00 p.m. and from 7:00 p.m. to 8:00 p.m.

Meetings of the NEAT Group are conducted at the Bonanza Steakhouse near Wellington Circle at the Malden/ Medford, Mass. line at 7:30 p.m. normally on the fourth Tuesday of each month (next scheduled meetings to be held Nov. 28), and all interested parties, whether video buffs, RTTY operators or SWLs, are invited to attend. The meetings are recorded on video tape for transmission through the repeater for the benefit of those unable to attend.

Future plans include the use of ASCII for computer video terminal operations (pending FCC approval), RTTY, slow to fast scan converter, computer link-up and touch tone functions. Among the umlimited possibilities for use are video mobile transmissions from disaster areas or parades, communication between deaf people, video games; a club public service activity might be a video Santa Clause hospitalized children could see and talk to via ATV repeater. Classes in amateur radio can be conducted by ATV for reception by invalids and other amateurs wishing to upgrade their licenses.

People new to the scene are surprised how simple and inexpensive it is to watch ATV transmissions on their family television. This can be done by simple tuning modifications of the set; or an ATV converter can be purchased for under $50.00 which is merely connected to the antenna terminals on the back of the set, or a converter with power supply can be built for less than $10.00. Further information can be found in amateur books and magazines, or come to a meeting of the NEAT Group.

On-channel audio transmissions can be received on a police scanner at 427.25.

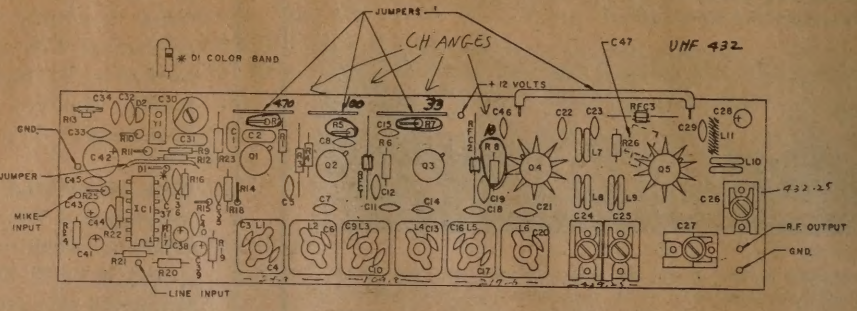
The NEAT Group soon expects to begin printing a bulletin for which articles concerning any phase of ATV are actively solicited.

Any inquiries concerning the NEAT Group or the Bulletin should be addressed to P.O. Box 307, Peabody, Mass., 01960, including SASE.

Tech license is minimum requirement for ATV.

## TX 432 UPDATE

Ralph W2RPO says he has some cures for wayward VHF Engineering TX432 transmitters. His changes are only differences in parts values and require no externally connected or mounted parts. He indicates that at Q1, change R2 from 270 ohms to 470 ohms, and at Q4 change R8 from 1 K to 10 ohms. Ralph says that these completely stabilized his unit and several others that he has encountered. The changes prevent over driving which is the culpret of some of the problems.




## COMMENTARY . . . The 1979 Handbook

Save your 1978 Handbook, its the last useful one you will own. The ads in QST are right, the new ARRL handbook is different. If you are looking for Fast Scan TV info, you won't find it. If you are looking for Slow Scan TV info, it's not in there, either. For its size, about equal to the Callbook, there is little in the handbook of interest. All the useful charts, reference tables and diagrams are gone. The whole book reeks of the old line I keep hearing about the ARRL's attitude towards ham radio . . . if it's not CW or SSB, it doesn't exist. And so you would think if you read the new Handbook.

Most of the material is a rehash of past Handbook/QST articles, about half at least. Then there is the new material. Reprints of the QST articles on narrow band voice modulation (a new way of modulation for SSB to reduce oocupied bandwidth). Then there are the tube circuits. Not that I have anything against tubes, but a tube transmitter for 35 watts on 40 and 80? Using about a half dozen foot warmers? Unless you are junking an old TV and an "All American five" AM table radio, as your only parts supply, there is little in that project to interest anyone. The parts list indicates that the 5 volt winding of the transformer is not used. What five volt winding? There is no mention of a specific part number to clue you in that there ever was a five volt winding!

While journalistically the Handbook is letter perfect, as usual, the layout leaves a lot to be desired. It seems that the more parts there are, the smaller the photograph. Projects with dozens of parts to a PCB get a single column picture, while an antenna tuner which has three parts has a picture twice as big.

Besides the later QST articles, the Handbook also has some material on TVI lifted from the FCC book on TVI. They did make on improvement, in leaving out the old stuff on ATV which has yellowed with age, they won't scare folks away who think that an RCA Electronic EYE 27 tube TV camera is "state of the ART"! Now if they would only include some of the frontier areas of ham radio and provide some inspiration to its readers, maybe they could sell more copies and do a real service to ham radio in the process.

Overall the "new" handbook is little more than a promotion for past issues of QST's. Maybe they need sales of back issues. At least I now have a reason not to sell my last year's Handbook. Actually I could have saved $9.75 by simply saving my 1978 QST's. It's a good thing that the editor's Newington phone number is unlisted, unfortunately, so should the Handbook. Henry WB9WWM.

# Xtronix

2206 Renfrew Ct. San Jose, Ca. 95131

* Amateur Television Equipment *

XTRONIX has a deal for you! Look for our new line of ATV equipment at the Dayton Hamfest on April 27–29 of 79'.

## WARC

## GREEN: 1– ARRL: 1 – HAMS: 0. The WARC score.

If you have been following the WARC literary battles in the big ham magazines and you should, you will note two continuing themes. The first is the old Wayne Green VS the Awful Rotton Radio League, commonly known as the ARRL, the second, is a lot of talk (which is cheap) and little significant action, which costs bucks. Not to say that there is not a lot of moola running loose in New England. The ARRL has been begging for a half million bananas to send their staff on international trips, to promote amateur radio. Sounds like a good idea. In fact, these have been akin to Congressman's junkets, since no real promotion has been viable. The trips have been to friendly ham territory, and the talk has been to other hams. The US is just about the only country in which hams, and the general public at large have any significant input to the WARC. In most cases, the decisions are political and military exclusively, and the hams have little if any input. There is a ray of hope, in that the cheap CW transmitter and receiver project, which has received a lot of input $$ from well meaning clubs, will actually start some ham activity in who knows where, but it is too small and too late to really gain any kind of foothold for hams where there is little or no ham activity at present. Them is the cold hard facts.

The text of each proponent is well worded to be able to cast blame on "others" later. Green notes his efforts to get ARMA to send a delegation to Africa, which he says was shot down by Ham Radio magazine, acting as a front for the ARRL. Could be. Green openly expresses his hope that his doomsaying falls through. Thus if we win he can say he said it first, and if we lose, he can say, I told you so. The ARRL is typically handing out its pap to the faithful sheep who would rather believe that all is well in Newingtonland, that the ARRL can save ham radio. Instead of pulling on the faithful to help in the cause, we are led to believe that all is well with statements that "hams are in the best poistion for any WARC). A neutral statement which on the surface seems to exude confidence. In fact, it is a carefully calculated statement to cover the frightful truth, that we could lose it all in 1979. The ARRL is simply saying that they THINK we are well prepared. If we lose it, the line will be, well, we did a good job, but it wasn't enough because of . . . - - If we win, then they will take credit for saving ham radio (like they "saved" 220!) Well folks, it's all politics. The truth of it is, despite Green's statements that the meetings in Washington were "of little value" there was a lot of good effort put in by a lot of highly talented people, who know ham radio and many other areas of importance inside out. The Washington meetings served one very important item. Preparation of the US position. Just as I write this, the last report and order is being printed by the FCC, which will detail the US position for the State department to work with. Already we have lost 220 Mhz to the marine service. Perhaps if Wayne's 220 use it or lose it effort had been directed to a position paper extolling the virtues of 220 use by hams, we would not have, but it's all monday night quarterbacking now. Too bad Wayne did not choose to participate. He would have been a valuable addition to help offset the crap from Newington. Not that the ARRL did not do some valuable work for the WARC preparation, they did. ARRL, typically, supported all the HF bands (160-10) and did scant for anything else. The VHF-UHF LF and other bands were supported by independent attendees, such as myself, who went to Washington for the meetings over the past three years, and provided volumes of information, data, projections and such to support ham activity on ALL ham bands. The ARRL's attitude to non HF bands is rotton. Ask any technician running for ARRL office! Perry Kline was at the meetings also, promoting OSCAR and AMSAT work, with illustrations of some of the public benefits which have come from these activities of ham radio.

The bottom line on this is what will happen in 1979 and how will it effect the hams. It's a real question mark. The US position has already eroded 160 meters to broadcasting (and there is a real battle in broadcasting over who will get the new frequencies, minorities, or daytime only AM stations). 40 meters has been dropped 50 Khz lower overall, 220 has been put into marine as primary and amateur as secondary service. So despite a good fight, what we won was a few more Khz for the three new bands at 10, 18 and 24 Mhz, and lost part of 160, 220, and shifted 40. So far, we are down about 4 Mhz of spectrum. At Geneva, we may well lose part of 80, most if not all of 40, and become secondary on many other bands. Crystal ball reading has not been my strong point, but I do not see a rosey future for ham radio HF bands. The three new proposed bands will probably be used as trading cards. I see us trading 10 Mhz to retain part of 7 and 14 Mhz, and trading 18 Mhz to keep part of 3.5-4 Mhz. All in all, we may retain the new 24 Mhz proposal, plus 15 meters. 10 meters simply because they do not have any value to international broadcasters due to their erratic nature. They simply do not work 100% or even 50% of the time in the long run, and it takes a lot of $$ to build an SW broadcast station. $$ which are more usefully spent building 5 megawatters at 7 Mhz. Actually, we would be better off at 6.5 Mhz than 7, since the BC stations have taken over 40 most of the night anyway, making 40 a new Daytime, shared time band for hams. Why not, Day for us, night for them. Then give us a slice we can use at night, and they can use at day, like 18 Mhz, or 24 Mhz.

Broadcasters wanted 1600-1800, and got 1600-1860. Hams, so far have more of 160 in more places on an exclusive basis in the current proposal.

VHF-UHF? If marine moves into 220, it would be in region 2 only. Presently that is where 220 is allocated for hams (N/S America). It's not available in other areas due to established services. 2 meters, probably safe since it is well occupied, probably present allocations will remain. 6 meters? Perhaps gains in Europe. Over here, it is next to TV ch 2, which will prevent use by many potential users, such as land mobile, who would tear up TV's too badly with their 500 watt FM rigs. 220-225 was the guard band for ch 13. Perhaps it is thought that

not too many folks watch TV on boats? The coastal harbors will really clobber TV reception though unless the power is restricted as it is presently in the VHF marine band to low power in port. 420-450 is sure to suffer, although we have good military support in the US which should help us, but out overseas friends may see a drastic reduction in the allocation (presently 8-10 Mhz vs our 30 Mhz) although sharing of UHF TV channels (almost a certainty) may take the heat off our band in favor of 800=950 Mhz activity. 1215-1300 will probably be reduced. It's too fat an allocation to go unnoticed, and domestic weather and military interests want the lower portion for satellite signals, which will take precidence. We may wind up sharing part and having part as a final solution. The microwave bands will bear scrutiny as developing nations like CHINA, look for satellite communications systems. Most are presently in teh 3.5-4.5 and 6-8 Ghz region, and the "new crop will be around 13 Ghz. There may be an effort to shave some of our allocations to make room for the new birds.

In any event, we stand to lose quite a hunk, no matter where you look. But, we may be able to retain most or nearly all of the popular bands presently in use, and perhaps end up with 1 or 2 new HF bands, with the possible loss of the use of 40 and a part of 80 to broadcast.

So the new bands will look like this (my best guess folks, here it is . . .) 1860-2000, hams only. 3.5-3.9 Hams, 3.9-4.0 shared. 6.9-7.0 hams, 7.0-7.2 shared with bcst. 10-10.2, maybe, slight chance of survival. 14 Mhz, no change 18 Mhz, better chance than 10 Mhz, perhaps 50/50 we get it. 21 Mhz, no change. 24 Mhz, ours by 90%, unless traded away for a part of 80/40 meters. 30 Mhz no change. 50 Mhz, increase in European usage. 2 meters, no change. 220, gone as a goose when shared with maritime, shared in areas with little boating opportunities (Colorado, Idaho, etc.). 420, OK over here, reduced in region 1 and perhaps in region 2 on a national basis is some areas (like Canada). Canada's proposals for 220 Mhz may modify the US position enough that we will not lsoe all of the band, in which case I look for us to keep 220-222, again, a safety margin for TV ch13. Right now my money is on keeping a part of 220. 1215-1240 lost, parts of 2300, 3.3 and 5 Ghz lost to satellite. Other bands of little interest to most other users. So get your 10.5 Ghz Gunnplexers going!

Unfortunately, probably none of the present participants at the Washington WARC meetings will go to Geneva. Also, few who do go, if any, will be around for the next one in 1999.

## SLOW SCAN TELEVISION NEWS

Amateur Television Magazine is now offering a series of award certificates for SSTV activity ranging from a basic award through several levels of difficulty to a Master Scanner award. The beginning level certificate requires the SSTV operator to have confirmed five SSTV contacts on each of any five ham bands, a total of 25 contacts. The bands used for all the levels may be any combination of the contestants choosing. Additional awards are available for working increasing numbers of stations on increasing numbers of bands.

Each certificate is 8 x 11 inches and suitable for framing. Numbered consecutively, each will attest to the operators proficiency. ATV Magazine will publish the names and calls of each certificate holder as issued.

The award levels are:

| | | | |
|---|---|---|---|
| 5 SSTV QSO's | on each of any | 5 bands, | 25 contacts |
| 6 SSTV QSO's | on each of any | 6 bands, | 36 contacts |
| 7 SSTV QSO's | on each of any | 7 bands, | 49 contacts |
| 8 SSTV QSO's | on each of any | 8 bands, | 64 contacts |
| 9 SSTV QSO's | on each of any | 9 bands, | 81 contacts |
| 10 SSTV QSO's | on each of any | 10 bands, | 100 contacts |

In addition to the normal frequency bands, the use of QSCAR may be used as 2 bands for any two OSCAR modes. i.e., 5 contacts via 450/144 oscar would count as 1 band for the basic certificate.

Applicants should send proof on QSO and $1 for postage for each award to: SSTV MASTER SCANNERS AWARDS, PO Box 1347 Bloomington, IN 47401. Allow two weeks for processing and award preparation.

## CQ SSTV DE K4TWJ

DAVE INGRAM
Contributing Editor
Amateur Television Magazine

Have you noticed the increase in on-the-air SSTV activity lately? Winter months are inspiring video interest, and the gang's having a ball. The 20 and 10 meter bands have been particularly good, and SSTV DX is coming through beautifully. Some of the fellows are producing very interesting programs while others refine gear, develop fantastic computer/video setups, design Medium Scan systems, etc. If you haven't been active on SSTV lately, you've missed a treat. Watch things flourish as we head toward another exciting Dayton Convention during 1979!

### SATURN VIA SLOW SCAN

Barring unforeseen circumstances, SSTV activity may again start popping at JPL's Club Station, W6VIO. I understand from Dick, K2SVP, that Voyager I will begin its flyby of Satrun during late January, or early February, and the mission will last approximately a month. Then as Voyager I moves on toward Jupiter, Voyager II will begin its flyby of Saturn. If the JPL gang is half as active during this mission as they were during the Mars mission, all SSTVers should find these activities a fantastic affair.

I assume you, too, will anxiously be watching 14,230 kHz to see whatever visions transpire.

### SUPER SLOW SCAN RIG

If you're looking for a super rig with some special features for SSTV operations, Yaesu's new FT901DM can't be beat. I recently purchased one of these jewels, and I love it. The variable bandwidth control is ideal for dodging QRM while peaking pictures for extra black or white response, and the notch filter works wonders on removing hetrodynes affecting picture reception.

I connect my 901DM and Robot 400 via rear panel connectors while leaving the mike connected to the 901DM's front panel jack. This allows me to talk during SSTV transmissions, if desired. The '901DMs Automatic Mike Gain Control (mike squelch) can be switched on to bypass this capa-

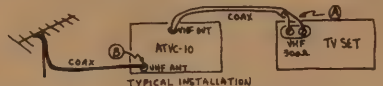
**(continued)**

# TUNABLE AMATEUR TV CONVERTER

NEW

ATVC-10

By connecting a UHF antenna to the input of the converter, and the output of the converter to the VHF antenna terminals of any TV set, the operator can see what the local hams are doing on a TV.




The circuit consists of a low noise, high gain RF amplifier stage with Varactor tuned input and outputs, an active (transistor) mixer stage with Varactor tuned input, and a Varactor tuned oscillator stage. Uses 3 transistors and 4 Vari-cap diodes. RF gain is adjustable.

The built-in AC power supply uses a transformer for power line isolation and 4 diodes in a full wave bridge. The supply voltage for the 4 tuning Varactors is regulated. The converter tunes electrically (no moving parts) from 420 to 450 MHZ and outputs on CHANNEL #3.

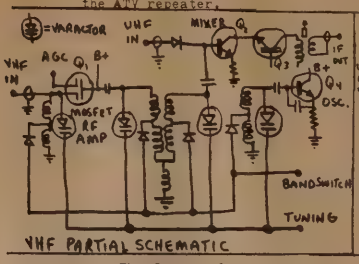
Note: From ARRL Specialized Communications Techniques.

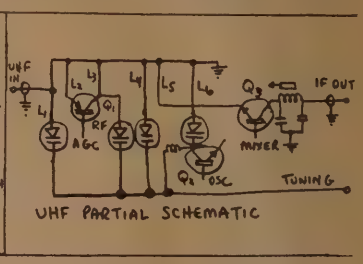
"Tunable converters are preferred over the crystal controlled variety, for several reasons. ATV is normally A. M. with two sidebands, rather than the carrier-and-one-sideband of commercial T.V. For the clearest picture it is helpful to be able to tune off to one side or the other of the ATV carrier, depending on the shape of the receiver i-f Pass-band, and local occupancy of the lower vhf TV channels".

The ATVC-10 comes completely wired & tested & guaranteed for 2 years. It is housed in an attractive 2 tone (walnut & beige) finished aluminum cabinet, only 1 7/8" X 4 1/4" X 4", with Full instructions Only $59.95.

# UHF/VHF VARACTOR TUNERS

The two tuners described below tune electrically (no moving parts) from approximately 50 MHZ to 1 GHZ (with a few gaps in-between). They are both HI-GAIN, LO-NOISE, STATE-OF-THE-ART tuners. They were manufactured for one of the leading manufacturers of Solid State Color T.V. They differ radically from conventional tuners since they are VOLTAGE tuned, rather than mechanically tuned. They both have double-tuned R.F. amplifier stages (a dual gate MOSFET in the VHF tuner). These tuners, in addition to their improved gain, noise and selectivity-provide increased tuning range (above and below conventional T.V. tuners) through the use of varicap diode tuning. This makes it practical to use the UHF unit to tune the 420-450 MHZ ham band with no modifications. Similarly, the VHF unit can be made to tune the 6 meter, 2 meter and 220 MHZ ham frequencies. Connecting the UHF unit in place of the conventional one in our TV set here in Bethpage, we were able to pick up the local ATV hams and the ATV repeater.




The frequencies that the tuners were designed to cover in their normal application are:

VHF 54 to 88 MHZ and 174 to 216 MHZ
UHF 470 to 890 MHZ

Varying the Varactor tuning voltages above and below those used for tuning the VHF & UHF TV channels provides the additional coverage into the adjacent ham, public service, etc. frequencies. Isolating the tuning voltage to the oscillator varactor offsets it to produce IF output frequencies other than the 45 MHZ Video IF normally used. We have been able to output at frequencies from 20 to 200 MHZ!

These tuners have been successfully adapted to provide specialized, hi-quality receivers and converters over a wide range of frequencies - as well as in other diversified applications (such as the spectrum analyzer described on the opposite page). Also, as tuner-subbers, remote control tuning (a la Jerrold), mast-head converters (convert 450 MHZ at the antenna and come down with 45 MHZ to eliminate UHF transmission line losses), telemetering receivers, etc. They are supplied with diagrams for typical applications and sold with a MONEY BACK GUARANTEE.

Prices: UHF --$7.95 ea. (2-$15)
VHF --$19.95 ea.
Combination (1ea. UHF/VHF) $24.95

Cat.#102 RCA SOLID-STATE VHF POWER AMPLIFIER

Commercial, mobile 150-170 MHZ, brand new, completely enclosed 9"X 2¼" X2" package. Contains driver & stud mtd. power transistors, metering leads, solid state T-R switch & Lo-pass output filter. 100 MW in, 6-8 Watts out @ 13.8 Volts. Schematic & 2 Meter conversion instructions included. Only $9.95.

Cat. #103 E.F. JOHNSON 8 CHANNEL UHF SCANNER CHASSIS

Tunes 420-470 MHZ. American made professional scanner. 10.7 MHZ & 455 KHZ Ceramic ladder filters. Ideal for dedicated ATV sound receivers ( on-channel or sub-carrier). Monitor up & down links, 440 repeaters etc.) Manual/Scan modes. Squelch & AFC. Built in power supply requires 12 volts A.C. or D.C. Sold for over $150.00. Complete chassis w/ front panel, schematic & parts layout, less speaker, channel crystals, & case. Checked out, only $19.95. Repairable, only $9.95.

Cat. #104 PRECISION DIGITAL MEDICAL ELECTRONIC THERMOMETER.

Made for hospital use -cost approx.$300.00 Range from 90.2°F to 106.9°F. Press & release button. Decimal point LED lights. After 35 seconds, warning beep signals temperature will be displayed for 10 seconds. Flashing decimal point indicates low battery, time to recharge. Shuts down automatically before lower voltage can affect accuracy. Contains 11 I.C.'s, 25 transistors, 20 diodes, audible alarm & 4 seven segment PIN-LITE displays. All parts have standard (2N,etc.) numbers. Can be used for it's original purpose or as the basis of many electronic devices. Substitute a carbon monoxide variable resistance sensor for the thermistor probe (data supplied) and tune your car! Operates on 6V. D.C. Complete P.C. board (as is) $6.95, (tested) $9.95. In alum. case, add $1.95. Thermistor probes (with coil cord & plugs) $2.75 ea. Charger base $5.95. COMPLETE,NEW-FACTORY SEALED PACKAGE Containing 1 thermometer in case, 2 probes (oral & rectal) charger base, shoulder strap, 4-AA NI-CADS & instruction manual. $24.95.

Cat.#105 AS-IS 12" SOLID STATE T.V. P.C. BOARD

Contains Video & Sound I.F., Sound det. & output, sync, AGC, video, Hor. & Vert. osc. & Amp., H.V. Xfmr, controls, CRT socket etc. No schematic. Approx. 6"X 8". Great for ATV'ers. Only $7.95

Cat.#106 DIGITAL TV GAME BOARD

Brand new, tested. Contains 95 standard TTL IC's (no house numbers), Xtal (16.128 MHZ) clock generates standard composite video & sync, character generator & counter circuits produce numbers. Sound effects circuits generate ping-pong sounds. No schematic. 5V. 2A. on board regulated supply. Just add filament transformer & paddle controls. Hook-up circuit & instructions supplied. Measures 9" X 17". Only $7.95.

Cat.#107 AUDIO OR R.F. OPERATED RELAY BOARD

Monitor your favorite repeater (or CB channel) while listening to radio (or stereo). Speakers (1 or 2) are switched from radio to your rig when this electronic marvel senses audio from your rig. Holds it as long as there is audio & then returns it to normal operation. Also mutes the radio while transmitting, automatically eliminating the need for switching one unit on and the other off (senses R.F.). Operates on 12V. D.C. Instructions supplied. Brand new, only $4.95

Cat.#108 RCA REGULATED DUAL SUPPLY

Two independent 150 ma. supplies, each adjustable from approx. 6 to 9 volts. Can be combined to supply 12 to 18 volts. Very low ripple. 9 transistors & 7 diodes. Transistor switched "power-on" light. Beautifully built, approx. 11"X5"X2" alum. package. 3 fuses. Instructions supplied, brand new-only $14.95

Cat.#109 NEW ATV BOOK "ATV IN A NUTSHELL"

Everything you need to know to build & operate your own HAM TV station. Over 60 schematics, figures, diagrams & photos. Only $5.00

Cat.#110 NARROW BAND F.M. CERAMIC FILTER SET.

Consists of 1- 10.7 MHZ filter and 1- 455 KHZ Ladder Filter, as used in the E.F. Johnson UHF/VHF Scanner. Supplied with scanner schematic showing how to use them. Also ideal for "advanced spectrum analyzer" application, etc. Set, only $9.95

Cat.#111 MAGNOVOX VIDEO I.F. STRIP

State of the art- MOSFET I.F. module. Ideal for building "off-the-air" T.V. monitoring & conversion receivers, etc. when used with our varactor tuners. With schematic, only $19.95

Cat.#112 ATV/UHF CONVERTER MODULE

New, UHF Varactor tuner, as modified for use in our ATVC-10 Tuneable ATV Converter. Input 420-450 MHZ. Output TV channel #3 (61.25 MHZ). Modified, tested & aligned-with instructions-$19.95

Cat.#113 ATV CONVERTER REGULATED POWER SUPPLY KIT

New. P.C. board and all parts to build regulated supply to power the ATV/UHF Converter Module. Includes trim pots for R.F. Varactor tracking & AGC, AC transformer, 3 terminal regulator, diodes, resistors, capacitors, etc. with instructions: $12.95

Cat.#114 COMBINATION CONVERTER MODULE & REG. PWR. SUPPLY KIT

Consists of Catalog #112 and #113. Only $29.95

NOTE: New I.F. strip for Spectrum Analyzer Kit in the works- old one sold out. Watch A5 for availability.

HOW TO ORDER:

Send check or money order - add $1 to orders under $15. or 5% over $15 for shipping. N.Y. residents add tax. COD OK, need street address for UPS. Satisfaction guaranteed. Our products may be returned within 10 days for a full refund (less shipping).

SCIENCE WORKSHOP
Box 393, Bethpage, N.Y., 11714

bility, or prevent in-shack conversation or noises from affecting transmitted pictures. I can monitor output SSTV and/or audio levels (via the speaker, no less!) by switching on the '901DM's monitor circuit. I also use a second SSTV monitor connected to this circuit as an "off the air monitor" of transmitted Slow Scan.

The '901DM's 6146B finals are also grand for SSTV use (consider the SWR between your exciter and amplifier when pushing to full bore SSTV use, and I think you'll agree tubes beat transistor finals), and it's 10 meter FM capability can be pushed into Medium Scan use. I could continue rapping, but I think you get the idea. Yaesu's FT901DM is a super performer. Couple it with an Alpha 77 and you can really be top dog.

### GEAR EXCHANGE

Several of the gang have mentioned they would like to see a roundup of who's interested in selling and/or buying SSTV gear, so we're going to start the ball rolling in this issue's column. We'll need to hear from all of you if this feature is to succeed, so drop me a note on any items you're trying to locate or any goodies you would like to unload. If there's enough support, we'll make this "Gear Exchange" a regular feature in A5. We'll start this "Exchange" with the following information which was recently received.

Rick, WB7DOS recently passed his advanced test, and he's looking for used SSTV gear. Here's a chance for some new Robot 400 owner to make a few bucks from his homebrew P-7 monitor. If you try shipping a homebrew monitor across the United States, however, I suggest you remove the C R T, yoke and focus units and pack them securely.

Ron, WD4HLS, is also looking for an inexpensive P-7 monitor; so amateurs on the East Coast might contact him for a "quick gear-to-cash" transformation.

I personally have a like new XQ 1020 Plumbicon, complete with homebrew yoke and focus coils which I will sell to a "homebrew SSTV camera" enthusiast for 35 dollars plus shipping.

If you have gear to sell or if you're looking for some particular item, drop me a note so we can help spread the word, my address is listed at the end of this column.

### TEEC/JTII

Jim Thomas, WB4HCV, recently returned to the SSTV game and he's producing a couple of interesting SSTV items. The HCV2SC digital scan converter is a 128/256 line unit with a combination of RAM and CCD memory. The HCV3KB SSTV keyboard produces typed information in several formats, has selectable 128/256 line capability, plus several special "test" buttons. Approximate amateur cost of this unit is 595 dollars from James Thomas Industries, Inc. (JTII) at P.O. Box 1056, Tucker, GA 30084 are now working with the amateur population on these units, so you can contact them directly for more information.

### MSTV

Medium Scan TV is gaining popularity at an encouraging rate, and stations on both sides of the Atlantic are now preparing to pioneer this fascinating frontier of live-motion viedo. Dr. Don Miller, W9NTP, is doing a beautiful job of spearheading operations, and he's keeping all interested parties informed with occasional MSTV Newsletters. If you're interested in joining this exciting project, send Don a couple of large self-addressed envelopes. I'll have more Medium Scan news in the next issue.

### CALL FOR HELP

Clay, K6AEP, relates that Nelson, ZL2FR, has been talking about two rare DX stations trying to get started with SSTV. These stations are VK9RH, Ray on Norfolk Island and Tom Christian, VR6TC on Pitcairn. Both stations are in a financial bind, and can't afford gear. Ray is quite active, which should indicate his sincerety. John, VK2XY, made an SSTV tape for Tom which he was overjoyed to receive. Nelson, ZL2FR, feels that some U.S. station may have an old P-7 monitor they would be interested in donating to either of these outstanding chaps. I'll second that motion! Unfortunately, I don't know anyone in that category, so I'll try handling part of this myself. I'm starting a VR6TC SSTV drive, and we'll donate whatever space and assistance necessary for whomever else starts a VK9RH drive. I'm collecting parts/equipment/cash for VR6TC in hopes of setting him up with at least a P-7 monitor and Flying Spot Scanner. I'll write a list of donors and activity in this column. If all goes smoothly, we'll have Tom on SSTV by Spring. Slow Scan can prove to be an outstanding educational, religious and medical tool for remote areas like Pitcairn. This may well be our prime opportunity to help mankind. Funny how such important opportunities evolve near W A R C time, isn't it.

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**Henry Ruh WB9WWM just received his Advanced class license and is operating on SSTV, while awaiting his new call. Several ops have already worked Henry, who is the publisher of this magazine. Henry is using a 40 meter di-pole until he can get a 20 meter antenna working, along with 50 watts from an Atlas 210x and a Robot 400 scan converter. Congrats on your upgrade boss!**

Wintertime is truly busy time for Slow Scanners. While many operators diligently strive to accomplish DXCC-SSTV, pursue the recently-announced A-5 SSTV awards or clamor to 14,230 kHz to view the exciting pictures from our space shots, etc. other SSTVers silently work to perfect their new designs before Dayton '79. Yes, things are again moving in "high gear" and headed for another super year of innovations.

The increasing yen to dollar ratio is becoming a serious "make or break" situation for both amateur equipment manufacturers and dealers. As the cost of Japanese gear increases beyond the cost of American-built gear, we find many companies considering with-drawing from the amateur market or drastically increasing prices. Will inflation/recession activities never cease?

### SSTV FUND PROGRESS

The VR6TC/VK9RH SSTV fund and gear collection is progressing very well at this time. Additionally, we expec to "wrap up" this project before you receive the next issue of A-5.

**(continued)**

# ROBOT SSTV NOW AT YOUR HAM DEALER!

## *See him today for your Free SSTV Demonstration.*

Now you can see what everyone's been talking about, and you can see it all right at your local amateur equipment dealer.

He'll be glad to demonstrate to you how simple it is to install SSTV in your station ...show you the high quality picture you get with the Robot 400, and let you see for yourself all the activity on the SSTV bands.

**NO PRICE INCREASE**
For a limited time we are holding the line on price, so Robot's Model 400 SSTV Converter is still the best bargain in amateur radio. **$695.**

**DEALERS: CALIFORNIA: Henry Radio,** Anaheim • **Ham Radio Outlet,** Anaheim • **Henry Radio,** Los Angeles. • **Ham Radio Outlet,** Burlingame • **Ham Radio Outlet,** San Diego • **Ham Radio Outlet** • Van Nuys • **FLORIDA: N & G Distributing,** Miami • **Amateur Electronic Supply,** Orlando • **INDIANA: Hoosier Electronics,** Terra Haute • **MASSACHUSETTS: Tufts Radio,** Medford • **NEBRASKA: Communications Center,** Lincoln • **NEW YORK: Barry Electronics,** New York City • **Harrison Radio,** Farmingdale • **OHIO: Universal Amateur Radio,** Reynoldsburgh • **Amateur Electronics Supply,** Wickliffe • **TEXAS: Madison Electronics,** Houston • **WISCONSIN: Amateur Electronics Supply,** Milwaukee.

**ROBOT**

ROBOT RESEARCH INC.
7591 Convoy Court
San Diego, Calif. 92111 U.S.A.

Assuming everything continues as planned, both of these DX stations will be operating Slow Scan TV within the next eight to twelve months. Hopefully, this vision isn't being over-optimistic, since we still need some rather expensive parts and several greenbacks (dollars) to cover exhorbitant postal charges. Any and all donations will be welcomed, and everyone will be informed of your assistance.

Brooks Kendall, W1JKF, is coordinating collection and postal efforts for VK9RH while I'm doing likewise for VR6TC. Jim Thomas, WB4HCV, provided a super-kickoff to the "DX Fund" by promising to deliver the following gear. Two - HCV-2 P7 monitor boards, complete with assembly and alignment instructions. Two - 300/150 volt C.R.T. transformers. Two - high voltage transformers. Two - HCV-2 vidicon camera boards, complete with assembly and alignment instructions. Two - vidicon transformers. Two - "C" mounts for camera lens. You can use this list to determine items still needed. A condensed list of such items will include: two - 5FP7 or equivalent CRT's. Yoke and focus assemblies for same. 15 kHz oscillator circuit for high voltage supply. Two - 7735A vidicons. Yoke/focus assembly for vidicons. A large group of resistors, IC's, pots, etc. plus two - monitor cabinets and two - 220 volt to 110 volt isolation transformers. Brooks and I are on the SSTV Net each Saturday (14,230 kHz; 1800 GMT) if you would like to compare notes on donations, or you can contact us via mail concerning donations. Let's all work together and introduce the DX stations to Slow Scan . . . ok?

## MEDIUM SCAN TV – THE DREAM CONTINUES

As of early 1979, MSTV progress is somewhat slow but relatively encouraging. Slow evolutions usually indicate success – we all hope this situation holds true for Medium Scan. The first phase of Project MSTV, communications checkout of the RF channel, was first performed during late December, and everything came through in flying colors. The W9NTP beacon transmitter on 29,150 kHz was received by amateurs throughout the United States, with signal reports varying from S-8 to 20db over S9. Here in Alabama, the beacon was solid copy with my FT901DM's pre-selector purposely detuned and while using a simple vertical entenna. As this column is being written, Don Miller is completing construction of the beacon's timer. At that time, plans are for the beacon to transmit MSTV test information for approximately 5 minutes at the first of each hour.

The next phase of MSTV (which may evolve before you receive the next issue of A-5) will involve transmitting conventional SSTV on 29,150 kHz using 30 kHz FM.

Following that test, the first MSTV transmissions will be aired on approximately 29,150 kHz. If everything goes smoothly, all the previously mentioned events will be performed successfully before Dayton '79 – and hopefully the first Transatlantic MSTV motion pictures will have proven successful. Dayton '79 should, indeed, be an exciting event.

Possibly I'm being "starry eyed", but I can visualize a group-shared MSTV remote base with audio output on 2 meters and scan-converted Fast Scan TV output on 432 mHz. Group users may thus have full reception capabilities when using a Handie Talkie and battery powered portable tv (UHF preamp and tuner screwdrivered to 432 mHz). MSTV transmissions would be accomplished by "calling up" prerecorded programs at the remote site when using the Handie Talkie's touch-tone pad. Naturally, this would necessitate group users frequently visiting the remote, however that concept is ideal if the remote is located in a user's home. Sharing costs 3 or 4 ways rather than individually makes sense – particularly when we realize future modifications need to made only once for all to enjoy. Alternately, the "remote" may include 10 FM audio capabilities should MSTV interest dwindle. 10 FM is coming on strong these days, with low power - wordwide communications being commonplace. Skeptic amateurs need only monitor the International Direct Frequency of 29,600 kHz any weekend to conform the validity of this statement.

## VIEWS FROM VOYAGER

The gang at W6VIO, J P L's Amateur Radio Club Station, is once again planning some exciting SSTV operations. Here's hoping your Slow Scan gear is in top condition and ready for the upcoming activities.

During the period of March 1 to March 11, W6VIO will be operating SSTV (14,230 kHz - most probably frequency) with pictures of Voyager 1's flyby of Jupiter. Stations working W6VIO during these activities (and QSLing to J. P. L.) will receive a commemorative QSL which will also bear a picture of Jupiter. A second W6VIO operation is also planned for July 6 to July 15 as Voyager 2 flys by Jupiter. Exact date of the first "encounter" will be March 5, and the exact date of the second "encounter" will be July 9. Let's all pull together and help keep frequencies clear for these operations, o.k.?

Incidentally, stations receiving "Jupiter Pictures" from the J P L gang might also consider alterting local newspapers or tv stations for coverage of these operations.

## THOSE RUSSIAN AMATEUR SATELLITES

Russia's new amateur satellites, RS1 and RS2, produced some very good signals during their first couple of weeks in operation. Assuming everything continues in this manner, these crafts could provide some outstanding SSTV "bush communications" capabilities. Since any signal over 10 watts ERP cause the transponders to switch off, mobile or portable stations will have the same capabilities as powerful base setups. Satellite users will either abide by these rules or not operate the satellite. Splendid!

Visualize, if you will, a mobile setup consisting of an ICOM 202 2 meter sideband rig, 3 db gain antenna, cassette tape recorder with some SSTV tapes and an Atlas transceiver. Suddenly the impact of operating Slow Scan mobile through a Russian satellite becomes a reality!

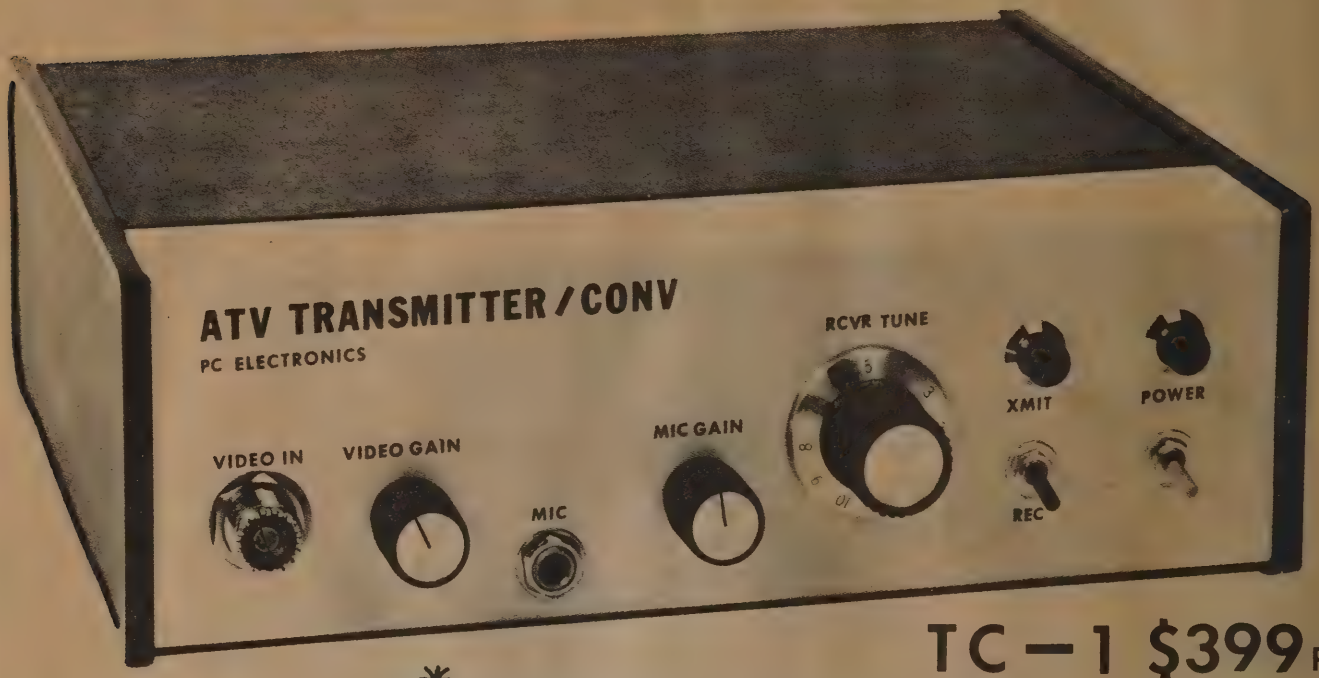
Two other outstanding aspects of the Russian satellites are their weekend operations and their 2 to 10 meter transponders. The exclusion of 70 cm capabilities doesn't infringe on ATV considerations in any way.

Remember gang, use 10 watts ERP maximum or the satellite will shut down until again coming in sight of Moscow. Sharing without usurping is the only way to enjoyment.

**(continued page 18)**

# FAST SCAN ATV

## ALL YOU NEED IN ONE BOX




**TC–1 $399 PPD**

*1ST QTR. GET A BUDDY ON SPECIAL 2 FOR 749

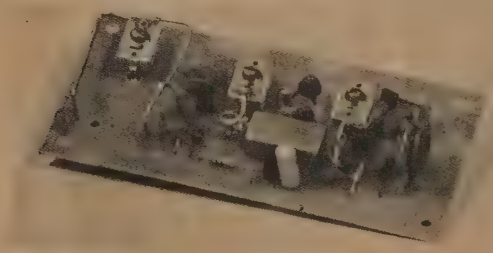
Connect to the ant. terminals of any TV set, add a good 450 antenna, a camera, and you are there . . . Show the shack, home movies, computer games, etc.

- 10 Watts peak RF output. Specify 434.0 or 439.25 MHz

---

## SPECIAL

ORDER ANY OTHER P. C. ELECTRONICS PRODUCT AND GET A VARACTOR TUNED TVC-1 ATV CONVERTER FOR ONLY $39. THATS OVER 10 BUX OFF! OFFER EXPIRES MARCH 31, 1979.



**TVC-1 ATV RECEIVING CONVERTER** ..... ~~$49.50~~ **ppd**

No need to destroy the TV set trying to convert the UHF tuner when you have one of these modules. It connects between the antenna and the VHF tuner in the TV set tuned to either channel 2 or 3 . . . which ever is unused. The built-in low noise preamp and double balanced mixer make this the most sensitive ATV converter. Varicap tuning allows ant. mounting to save line loss.
Requires 10 to 18 VDC @ 20 ma.

Send S.A.S.E. for catalog of ATV Modules and PC Boards. W6ORG

P.C. Electronics, 2522 Paxson Ln., Arcadia CA. 91006

1-79

# FROM P. C. ELECTRONICS

## 12" BLACK & WHITE LOW COST VIDEO MONITOR

**$139.00** + $ 5.00 SHIPPING

# LEEDEX

# video 100

- *Ideal for home, personal and business computer systems & ATV*
- *12" diagonal video monitor*
- *Composite video input*
- *Compatible with many computer systems*
- *Solid-state circuitry for a stable & sharp picture*
- *Video bandwidth—12 MHz ± 3 DB*
- *Input impedance—75 Ohms*
- *Resolution—650 lines Minimum IN Central 80% of CRT; 550 Lines Minimum beyond central 80% of CRT ref EIA RS-375*
- *Dimensions—11.375" high; 16.250" wide; 11.250" deep (exclude video input connector)*
- *Weight—6.5 KG (14.3 lbs) net*

All prices are delivered in USA. All orders are check, money order, Master Charge, or Bankamericard. Allow 3 weeks after receipt of order for delivery. Charge card orders only by phone 5 to 6 PM your time: (213) 447-4565.

Send S.A.S.E. for catalog of ATV Modules and PC Boards. W6ORG

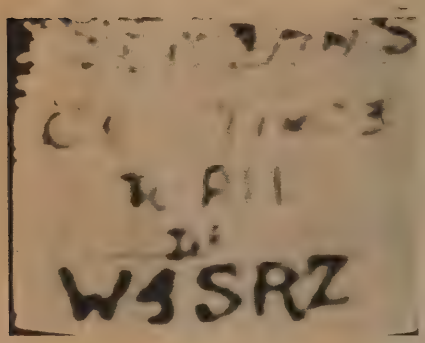
P.C. Electronics, 2522 Paxson Ln., Arcadia CA. 91006

1-79

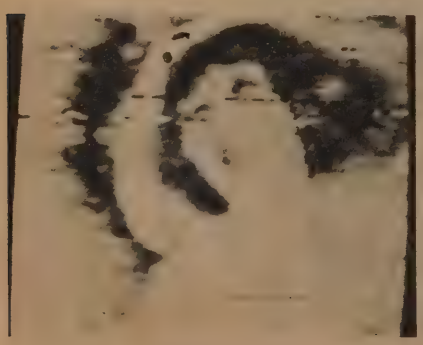
## SEE YOU ON SSTV

That's it for another issue. Remember to send your notes on activities, operations and SSTV ideas to K4TWJ. We'll include them in the next column and let others know what you're doing. Come on – don't be shy. Let's hear from you soon! 73, Dave Ingram, K4TWJ, Eastwood Village No. 1201 South, Rt. 11 Box 499, Birmingham, AL 35210.

**NEWS FLASH: A complete SSTV station has been shipped to V$6TC, consisting of a Robot 400, new camera, new monitor, cassette recorder and tapes. This equipment was collected from donations of avid SSTV'ers and with the help of Robot's staff. The SSTV station was shipped by air to Florida for shipment on the Yankee Clipper to Pitcarin Island. With luck, Tom should be on the air in a few weeks. Our thanks to everyone who helped in this project. WB9WWM.**

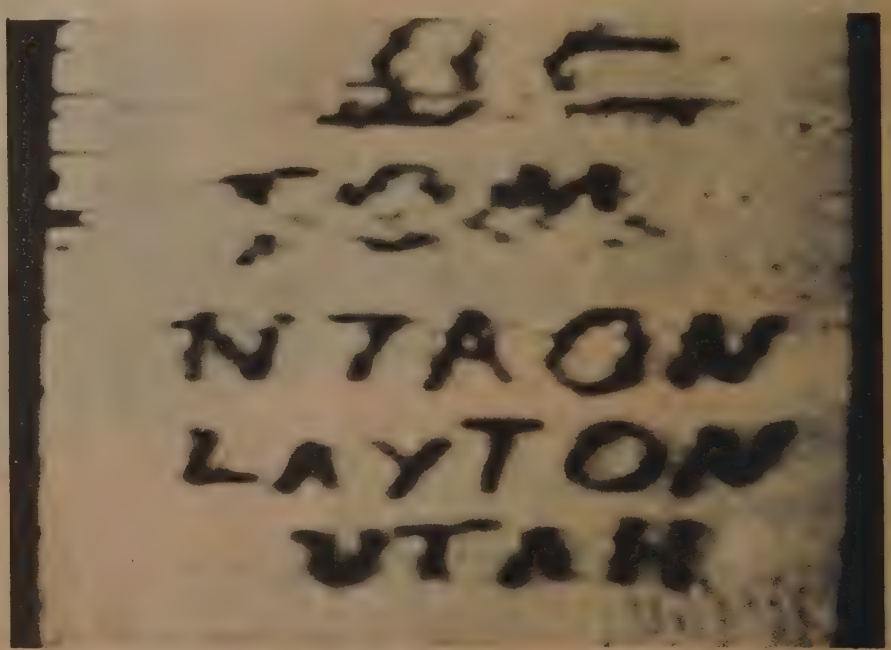



**A special Season's Greeting note from W45RZ, was noted several times during the holiday season.**



**Another interesting video transmission from W45RZ illustrated this original Southern Belle looking quite pleasant while Illinois and Missouri were engulfing in the "Blizzard of 79".**

**Here it is–the first SSTV relayed picture of Jupiter, compliments of Dick, K6SVP and J.P.L. This view shows the multiple layers of clouds on Jupiter. These clouds are mainly ammonia ice crystals covered by minute amounts of material of presently unknown composition. A unique shadowing effect of the planet Jupiter during the time of this picture caused the planet to have a strange appearance rather than appearing completely round. The sky of Jupiter appears black in picture while its clouds are quite bright. Jupiter's phenominal 'red spot', the mysterious place assumed to be a source of electromagnetic radiation, is shown vaguely in lower right of picture. This view was taken with a 1500mm telescope aboard Voyager 1. The spacecraft was approximately 50 million miles from Jupiter. My special thanks to K65VP for the 20 meter transmission of this view to me, K4TWJ.**




**Newcomers to SSTV are hitting the airwaves in large numbers–and enjoying every minute of it. Here's Tom, N7AON in Utah checking out the action on 14,230 kHz. Tom also runs the Thursday night SSTV net on 14,230 at 2300 Z. The Thursday night net is the Slow Scan Technical Net, and is specifically for those who need help with equipment, operations or have other questions about SSTV. Several experienced hams will be available to answer questions and help diagnose problems on the air. "If we take 2 hours to fix someone's broken scan converter so they can be back on the air the next day, we will spend the two hours fixing the scan converter", says Tom, the net control station. This will be an on-the-air clinic as well as just good fun!**

## SSTV HOME BREW CONTEST

As part of the next Worldwise SSTV contest, the firm of TPE of Ing Liuzzi co sponser with the I A T G Radiocommunicazioni will offer a very nice prize. Those participants who use home brew SSTV equipment or original modifications to commercial equipment can participate in a second portion of the contest. A committee will review entries from the SSTV'ers photo's diagrams or other descriptive matter of the home brew or modified SSTV equipment used in the contest.

The winner will receive a flying spot scanner, useful for sending pix of slides, photos and other items. Entrees in the home brew part of the contest as well as the SSTV stations participating should send their entries to Franco Fanti, Via Dallolio n 19, Bologna, Italy.

## MSTV NEWSLETTER NUMBER 3

This is newsletter Number 3 on the development of a Medium Scan Television system for use on the 10 meter band. For those not receiving the previous newsletters, attempts will be made to bring each of you up to date on the progress and the best of the previous newsletter announced developments. Some older ideas will not pay off and will be dropped as newer ideas predominate.

Most of the time during the past six months has been spent in putting together a RF transmission system that will pass 36 KHz bandwidth. The first thoughts were to use old 30 MHz gear that is surplus in some areas. Closer investigation seemed to indicate that these units might be hard to obtain and they didn't work very well when tried. One night I felt that I received a revelation on the subject and I am not trying out this new scheme. It works this way.

**(continued on page 22)**

## 3° "ALBATROSS" SSTV CONTEST 1978

**Sponsored by CQ-TV Mag. and A.F.C. Ing Lodi (Bologna)**

| | | | | | | |
|---|---|---|---|---|---|---|
| OM | | | | | | |
| 1) | SM5EEP | 240 x / (10 x 4) | + | (5 x 21) / | = | 34.800 |
| 2) | LZ2EE | 208 x / (10 x 5) | + | (5 x 19) / | = | 30.160 |
| 3) | ISØRUH | 187 x / (10 x 3) | + | (5 x 28) / | = | 22.440 |
| 4) | IØVMV | 141 x / (10 x 5) | + | (5 x 19) / | = | 20.445 |
| 5) | LZ2KKK | 157 x / (10 x 4) | + | (5 x 16) / | = | 18.840 |
| 6) | G3GRJ | 147 x / (10 x 4) | + | (5 x 14) / | = | 16.060 |
| 7) | WB9OGS | 150 x / (10 x 2) | + | (5 x 15) / | = | 15.10 |
| 8) | DJ6KA | 118 x / (10 x 4) | + | (5 x 14) / | = | 12.9 |
| 9) | W6WDL | 68 x / (10 x 2) | + | (5 x 12) / | = | |
| 10) | I4LRH | 70 x / (10 x 2) | + | (5 x 9) / | = | |
| 11) | HA8VV | 38 x / (10 x 3) | + | (5 x 14) / | = | 3.880 |
| 12) | LZ2DL | 36 x / (10 x 2) | + | (5 x 5) / | = | 1.620 |
| S.W.L. | | | | | | |
| 1) | I1-5007a | 112 x / (10 x 3) | + | (5 x 13) / | = | 10.640 |
| 2) | LZ-1-90 | 84 x / (10 x 5) | + | (5 x 14) / | = | 10.080 |
| 3) | DOK-005 1694785 | 32 x / (10 x 2) | + | (5 x 13) / | = | 2.720 |

## 9° WORLDWIDE SSTV CONTEST

**Sponsored by I.A.T.G. Radiocomunicazioni and T.P.E. Ing. G. Liuzzi**

The Italian Magazine **eq elettronica** have pleasure in announcing the 7th Worldwide Slow Can TeleVision Contest.
Scan TeleVision Contest.
The purpose of this Contest is to promote increased interest in the SSTV mode of operation as used by Radio Amateurs.

### RULES

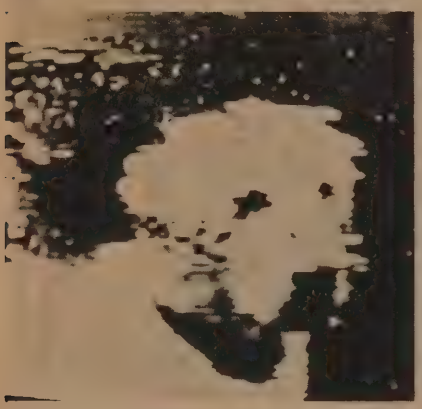
1) **Periods Of Contest**
Part 1 15.00 - 22.00 GMT on March 17th, 1979
Part 2 07.00 - 14.00 GMT on March 18th, 1979

2) **Bands**
AM authorised frequencies within the 3.5-7.0-14.0-21.0 & 28.0 MHz bands.

3) **Messages**
Messages will consist of: Exchange of pictures and also included are a) the call sign; b) report (PST); c) serial number.
The serial number must start at ØØ1 and is increased by one for each succsive contact during the period of the Contest and the serial number is irrespective of the Band(s) used.
Exchange must be made exclusively with the SSTV mode. For the "W" are accepted the FCC Rules.

4) **Exchange Points and Multiplier**
a) Contact score 1 point per contact on the 3.5, 7.0, 14.0, 21.0 Mhz Bands 5 points per contact on the 28.0 Mhz Band.
b) A multiplier of 10 points for each Continent (Max 60 points) and 8 points for each Country (ARRL List) worked can be utilised on each band. In addition to the ARRL List will be considered as separate Countries the W call areas WØ to W9 and VE Call areas from VO to VE7.
The same Continents and Country is only valid once on each Band. The same station can only be worked once on each Band (Max 5 contacts) during Contest period.

**(continued)**



**Top SSTV picture: G4ZCT as received on 14,230 kHz recently. His signal was a comfortable S-9, and many Slow Scanners enjoyed exchanging "across the pond views" with him. Center SSTV picture: G4ZCT's son as viewed on SSTV, also has a "British look". Bottom SSTV picture: G4ZCT's dog – also a quite English oriented-looking critter.**

5) **Scoring**
Total exchange points multiplied by the multiplier total.

6) **Handicap**
Winners or precedent Contest: less 6% of the total final score.

7) **Sections**
a) Entrants transmitting and receiving video. ATTENTION: ONLT SSTV.
b) Entrants receiving video only. For this purpose the same general rules apply and the same station heard is valid once only on each Band.
A separate results table will be made for each of these two classes of entry.

8) **Logs**
Logs should contain: Date, Time of contact (GMT), Band in use, Call sign, Report (RST) send and received, Serial numbers sent and received, points, multipliers and final score.
Although not essential, it would be appreciated if entrants could enclose a cover sheet with a short description of the Station (With photo if possible) together with any comments on the Contest.
All entrants are kindly requested to report on any serious Contest irregularities e.g. Exchanges in other modes.
For entrants in the b. Classification it is only necessary to record the message of the station heard.
All Logs must be received by not later than 30th April in order to qualify.
Send them to: **Prof. Franco Fanti, Via A. Dallolio n. 19, 40139 Bologna, ITALY**

9) **Prizes**
1° A free 12 month's subscription to **cq elettronica** Magazine
2° A free 6 month's subscription to **cq elettronica** Magazine
3° A free 6 month's subscription to **cq elletronica** Magazine

10) **Rules of Behaviour and Penalization**
The Logs must be compiled in accordance with the Rules listed in (7). The contacts must be made by means of the SSTV mode and it is not permitted to use other mode of transmission either before, during or after the exchange of message by Slow Scan TeleVision.
During the Contest it is expected that Amateurs will observe the fundamental rules of courtesy and good operating during contacts. The "Contest Criteria" of the ARRL are valid for this Contest.
Failure to observe any of the above Rules will result in the exclusion of the entry from the final results and any such Logs received will be considered as check Logs.
All Logs received become the property of the Edition CD and will not be returned.
The decision of the organising Committee in any dispute will be final and any subsequent controversy cannot be referred to the Civil Court. Include with the LOGs 1 DOLLAR or the equivalent in the local money. This will be used to send the final score and the rules of the next expedition.

I/We the undersigned declare that all the rules of this Contest have been observed and the Paragraph 9 has been read and understood.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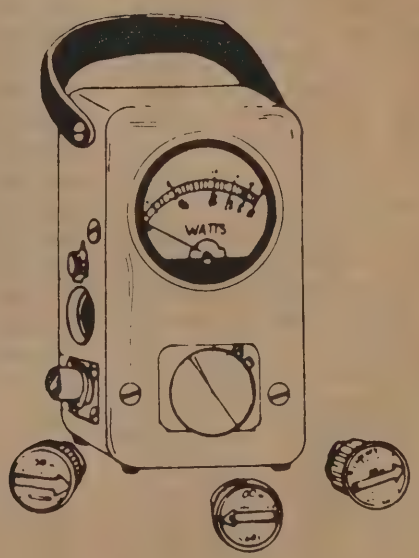


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(continued from page 19)

Most transceivers have a VCO that can be varied over 100 to 500 KHz range. The front ends are quite wide and the IF's that follow are wide until the signal ultimately arrives at the 455 KHz filter where it is reduced in bandwidth to 2.2 KHz. It is also ture that older 2 meter FM gear like the Motorole 41V etc have a 455 KHz IF and are designed for plus and minus 15 KHz deviation. Why not connect a cable from the Collins gear before the filter to the input of FM IF? The discriminator also looks good in these rigs and if the detected signal is brought out without going through capacitors it can be amplified and fed to the A/D converter of a scan converter or monitor.

Well this is the idea. A few tests have been made and it seems to work reasonably well. Levels have yet to be set. The principle can be used on any transceiver. If the IF is 9 MHz or 5 MHz like many of the popular rigs it will be necessary to build or find a FM receiver that has this IF. If it is 9 MHz some of you clever experimenters might be able to use a 10.7 MHz IF if you narrow down some of the IF's by synchronous tuning or tighter coupling.

The beacon on 29.150 MHz has been on at different times. Starting on Jan. 13, 1979, the beacon will be turned on for the first 10 minutes of each hour as long as the band is open. With this new scheme, I needed to order a crystal which is slow in delivery. I have been testing the identifier on 28.7 because of the crystal problem. The first series of tests will be the identifier. It says in code the following message. W9NTP 36 KHZ WBFM MSTV EXP. This signal will be a part of the final test signal. I forgot to say in the previous paragraph that the VCO of the Collins gear can be FMed with a circuit appearing in many handbooks. I am enclsoing it for your use. When this FM circuit is installed, the first signals will be a SSTV signal (no subcarrier) but at SSTV standards. I mean by this that the repeating 8 second picture will be FMed directly without using the tones 1200, 1500, 2300 Hz. This will give you a chance to try out your receiving scheme. If you receive this signal you can use it to modulate a local SSTV FM modulator and look at the picture directly on your conventional SSTV gear.

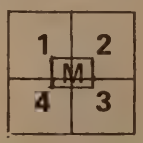
The beacon will run first on Saturday and then be extended to Sunday afternoon when it becomes more operational. The entire message will include the IDer and then 10 minutes of video and then a voice (recorded) announcement on the type of video sent. At first it will be SSB slow scan. Later it will be FM (wideband) SSTV that you must remodulate on to a local SSTV oscillator to view, and finally MSTV FMed on to the carrier. If I am around I will listen for a few minutes after each ten minute period for a SSB contact. You will notice that the above technical scheme will in no way affect the operation of the Collins SSB gear.

On the video scene, progress has been slower in the laboratory but very active on the design level. First of all, a 5 field persecond, interlaced test generator was built and connected to a MXV type of P7 monitor. This results in 64 lines every 20th second. The interlacing worked very well and the previous field did not seem to decay much between interlaced fields. The grey scale was good but the flicker rate was terrible. I have known for a long time that 5 Hz is a bad phsychological frequency and these tests bear this out. A few minutes of viewing made the viewer head for the "head". This means that this format can not be viewed on a P7 monitor. The motion was ok and if a scan converter was built for this standard it would work very satisfactorily. I plan on transmitting this type of picture some of the test time so if you would like to try it on your P7 monitor all that is necessary to do is to connect directly into the sweep drivers after changing the sweep capacitors to new values and increase the bandwidth of the signal amplifier going to the kinoscope by removing the filter capacitors that are in the design. This is a 15 minute change. The base video bandwidth is about 20 KHz. This is almost too high for modulation on a 36KHz channel. Let us look and see if there is a better choice of format.

I have always felt that during this two year period every attempt should be made to make the picture format workable with the Robot 400 scan converter. It has a square format. Consider the picture as it is now, but transmitted twice a second. This bandwidth can be calculated to be about 16 KHz. This fits the allocated spectrum fine. In addition consider a window in the middle of the screen of one quarter size. The size of this window would be 64 by 64 pixels. Most of the action takes place in the middle of the screen anyways so why not increase the motion where it really is? Thinking this way it should be possible to send the entire picture everyonce in a while all at one time or in parts and send the middle quarter much more often. Now this faster section could be slewed to any part of the picture with a joy stick to follow the operators preference. This manual operation will eventually lead into the second phase of the tests where picture differences are the driving force to slew the faster window.

I have worked out several formats to keep the base video frequency below 16 KHz. The best one that I have determined works this way. Consider the picture divided into four areas. The fifth area is the middle area that is superimposed on top of the other four areas. See the sketch.

All of the transmissions are of the same length and makes syncing easy. The picture rate is one frame every 3 seconds with the middle section repeating 7 times per second. There are probably better transmission formats when we utlimately go to a 4 x 3 aspect for the final design. If you can think up a better one let me know.




Data rate = pixels / 2 x lines x field rate
= 64/2 x 64 x 8 = 16,384 KHz

The transmission format is: middle, middle, middle, middle, middle, area 1:
middle, middle, middle, middle, middle, area 2:
middle, middle, middle, middle, middle, area 3:
middle, middle, middle, middle, middle, area 4:

I am sending this newsletter to all that expressed original interest. This is the last time unless I receive a SASE from you. Of course this does not

apply to the experimenters and the foreign mailings. Look for the beacon on 29.150 MHz. I am on slow scan television every Saturday at 1800 GMT on 14230 KHz. At 2000 GMT the net control asks if there is anyone who wishes to talk MSTV. If there is, W9NTP QSY's to 14,260 KHz for a MSTV discussion contact. See you on MSTV before July 1980.

Don C. Miller, W9NTP
Waldron, Indiana
46182, USA

## HOME SATELLITE TV TERMINALS

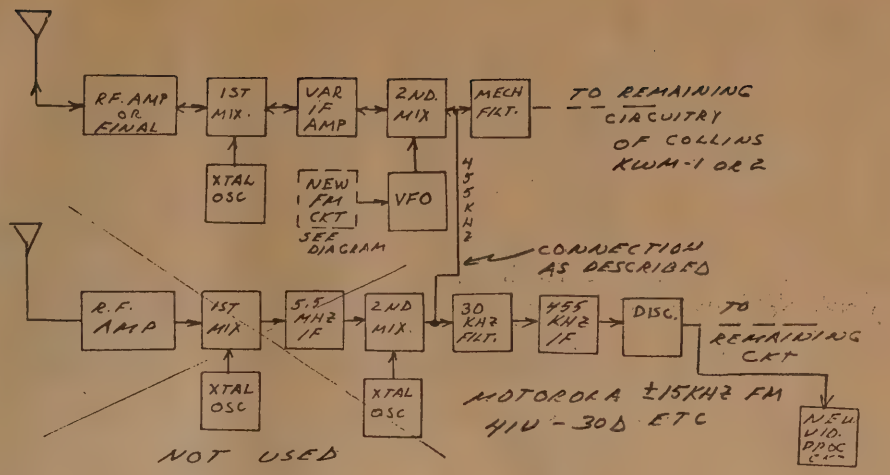
Our mention in the last issue of A5 about home reception of satellites which re-broadcast (translate) various TV signals brought a flood of mail both to A5 and to the person in the know, Bob Cooper K5KHT. Not to mention phone calls at all hours of the day and night! While we appreciate your interest we must ask for your understanding if our wives yell at you when you call at 3 AM in the morning!

A highlight of this year's DAYTON HAMVENTION will be an operating portable satellite receive terminal. To save writing that over and over, they are called TVRO's. It will be set up outside of the main exhibit hall, and Bob Cooper will present a 90-minute demonstration including a question period. The received TV signals will be available for viewing at the A5 Booth.

Who is Bob Cooper? He publishes the CATJ, Cable TV Journal, which discusses such things as how well the "birds" operate, what the problems for cable operators are in receiving the "channels" who's on what channel and why, and dozens of other related topics. In addition, Cooper provides such nice things as HOME VIDEO/AUDIO RECEIVERS FOR USE WITH THE GUNPLEXERS in kit form. Everything you need to transmit and receive uadio and **video** on your ham band 10.5 Ghz gunplexers. He also has a tremendous ability to provide information we hams can use for microwave work, including how to build your own home video TVRO.

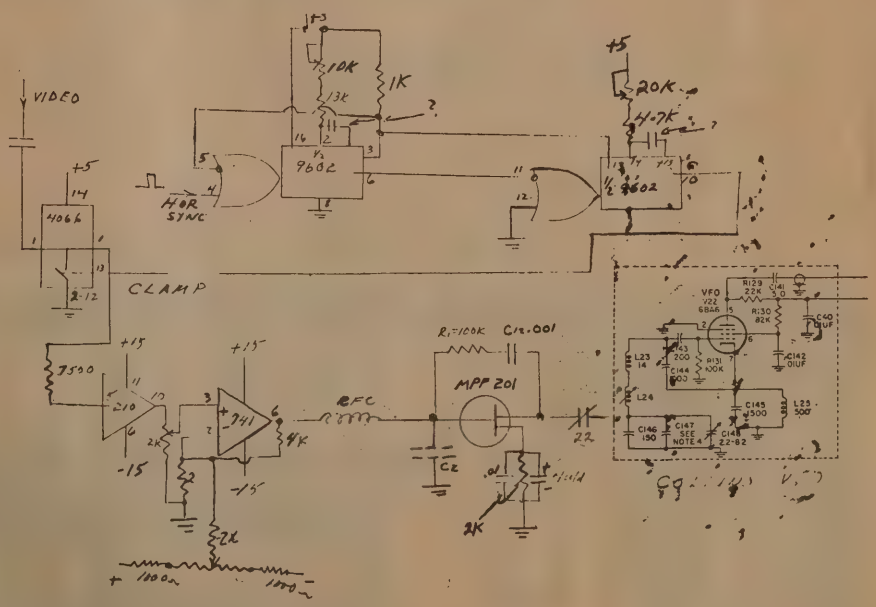
If you are interested in satellite television reception, Bob Cooper W5KHT has put together a 'study

**(continued page 25)**




WØLMD has purchased some Motorola gear that may do the whole job. He is doing what was originally suggested, i.e., converting both the transmitter and receiver of an old FM communication system. If you would like to correspond with him he is listed as one of the original experimenters or is in the call book. Most of the experimenters call in to the SSTV each Saturday at 2000 GMT. They then move to 14260 KHz for the discussion. Most of you have heard my beacon by now. Most of the future work will be getting our act together for the Dayton Hamvention where we will have a public unveiling of the best of the many ideas. Even if you are not capable of actively experimenting, we welcome all ideas of a theoretical nature. It is a fascinating pasttime trying to outwit mother nature in the use of the spectrum. Remember the way to keep the newsletters flowing is to send A SASE for the next one.

Don C. Miller
W9NTP

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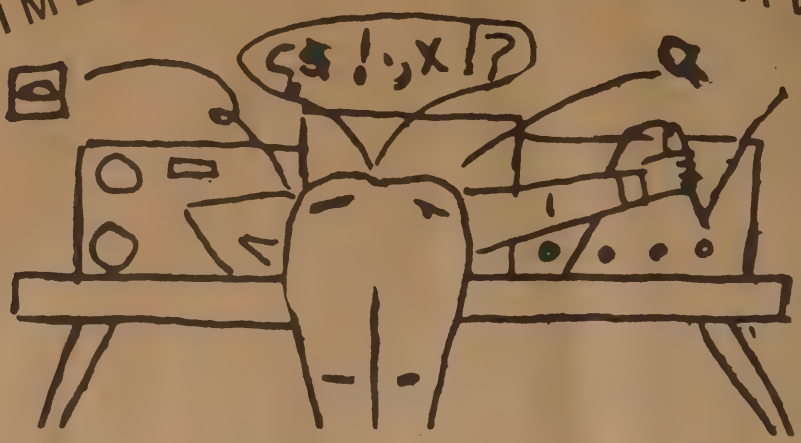


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**(continued from page 23)**

package' which he makes available for $10. He prepared this packet after appearing on the CBS evening news on Oct. 31st where they showed his private backyear satellite terminal in operation and after TV Guide ran an article he wrote on the same subject 10 days earlier. Swamped by thousands of letters and phone calls, Cooper tried to answer most of the questions in one shot and prepared the package. Bob is editor in chief of CATJ, a monthly cable TV/satellite technology magazine which currently carries considerable material on the satellite technology magazine which currently carries considerable material on the satellite TV systems growth. If you are interested in learning more about this subject, send $10 to CATJ Satellite Study Package, Suite 106, 4209 NW 23rd, Oklahoma City, OK 73107. Be sure to tell them A5 sent you!!!!!

For Dayton, Bob will prepare handouts which will explain ham applications for the systems. In the meanwhile, here is an article by Bob to tickle your fancy and get you primed for Dayton.

DIRECT INFO, on frequencies used (exactly) hardware, transmitted signal levels (called footprints) and dozens of other important data, pix, diagrams, etc., is available in a full color wall chart from Microwave Associates, 63 Third Ave., Burlington, MA 01803. 617-272-3100. I don't know if there is a charge for it or not, but it does explain a lot of the terminology, show what is needed, helps you calculate antenna size, preamp (LNA) requirements, etc., to receive any of the birds, as well as tell you where to look. Most important. A subscription to CATJ is most rewarding in getting the inside info, and for $14 a year, is cheap enough compared to some of the special publications around which go for $75 or more a year for the same material!

Frankly, watching something other than the pap served up by the US national networks has always intreagued me. When I lived in Michigan, I erected one of the biggest private TV DX terminals (remember my 166' tower?) to gather in signals from Canada, 70 miles to the east, and successfully pulled in regular stations from Windsor to Montreal. The idea of watching TV programs from India, France, England, Alaska, Canada, etc., is going to drive me nuts until I can build a terminal for myself. For those of you who have the knowledge and bucks to build your own, the Sept., Oct., Nov., Dec. issues of CATJ really tell you all you need to know. I suggest you fire off $5 for the back issues, while the supply lasts. I am sure as soon as the word is out, they won't last long! Needless to say, I am NOT lending mine out!!

## SATELLITE TV TERMINALS

**by Bob Cooper, Jr. W5KHT**

A great deal of new interest has appeared in 'backyard satellite TV reception terminals (known as TVROs in the trade), following publicity in TV GUIDE (10-21-78), the CBS Evening News (10-31-78) and elsewhere. The publicity to date is but the tip of an iceberg in as much as there are additional features planned for numerous other national 'consumer' and electronic magazines throughout 1979.

Basically, the satellite TV reception craze has been fueled by the rapid growth of the cable television industry and its use of satellites for nationwide program relay. As of February first (1979( there will be on one single satellite a total of 20 separate 'transponders' (that's space talk for channels) operating for the exclusive purpose of relaying movies, sports and other 'entertainment' throughout the United States to cable TV systems. The movie 'channels' include Home Box Office (HBO), SHOWTIME, Fanfare, Home Theater Network and Warner Brother's STAR Channel. Sports includes nearly 200 events a year from Madison Square Garden (Events) plus a wide selection of additional sports on HBO and Fanfare. And there are three full time (24 hour per day) religious channels (PTL, Trinity and CBN) plus three non-network (i.e. independents) regular TV broadcast stations 'on the bird' (Atlanta's WTCG – widely known as 'Super 17', Chicago's WGN and San Francisco/Oakland's KTVU). And that really just scratches the surface because in my home there are up to 40 separate TV channels available from satellites (four separate satellites at the present time) on a simultaneous basis.

And since the satellite is in geostationary orbit (35,000 Km above the equator between roughly 100 degrees west and 135 degrees west) it is visible 100% of the time over all of the United States and most of Canada (that portion south of 80 degrees north).

This is obviously good stuff; so good that after the TV GUIDE article appeared hundreds of private individuals with lots of bucks descended upon the handful of equipment suppliers in this industry waving $20 - $40,000 checks to buy their own back yard terminals. Most of us don't have that kind of spare change sitting about however so we have to substitute 'smarts for dollars'. How does it work?

Well, the satellite receives its 'uplink' or input signals in the 5.9 to 6.4 GHz region. The satellite is not unlike Oscar, except much more sophisticated and expensive (try on $25M per bird). It 'translates' the 5.9 to 6.4 range internally down to 3.7 to 4.2 GHz which it then sends back down to earth using specially designed high gain (but broad beamwidth) antenna patterns. Each of the transponders (or channels) has a peak power of 5 watts at saturation (+7 dBm) and the antenna gain is maximized around 29 dB in the center of the pattern. This results in an effective radiated power of +36 dBw in the center of the pattern (which typically falls between St. Louis and Toronto) with slightly less ground level signal in Los Angeles (down 3 dB) and Miami (down 5 dB). The downlink signal is FM/FM. That is, the video is FM occupying a 34 MHz bandwidth and the audio is carried on either a 6.2 or 6.8 (FM) sub-carrier. The downlink range from 3,700 to 4,200 MHz is broken down into 12 channels each 40 MHz wide, with some guard bands thrown in plus a beacon frequency at both ends. The RCA satellites (SATCOM F1 at 135 degrees west and F2 at 119 degrees west) use something known as 'frequency re-use' and they get 24 transponders or channels out of 500 MHz. They accomplish this by sending up and back 12 on vertical polarization

**(continued)**

and 12 more on horizontal using a half-transponder frequency-offset interheaving approach. Western Union (WESTAR I at 99 degrees west and WESTAR II at 123.5 degrees west) plus the Canadian ANIK series birds (ANIK III at 114 degrees west is the most used) all are 12 channel only; horizontal polarization.

I have a 'monster' 20 foot parabolic (steel construction on a polar mount) which I put in 18 months ago and it is frankly too much antenna for most requirements. However, it has 'international advantages' which I'll describe briefly shortly. I also have a ten foot (3 meter) and a 6 foot (1.83 meter) which deliver satisfactory results when married to the proper electronics. It turns out that the signal levels present (known as footprints in the trade) are strong enough that a ten foot with a 2.5 to 3.0 dB noise figure pre-amplifier (known as an LNA for 'low noise amplifier') will produce 'out-of-noise' signals in about 80% of the USA (and most of southern Canada). The 2.7 to 3.0 dB noise figure region is important because you can construct this grade of LNA with fairly inexpensive bi-polar transistors. On my 6 foot antenna I get reception that is verging on having noise on the stronger satellites but I have a rather exotic 90 degree Kelvin (around 1.0 dB noise figure) LNA on it. Once you drop below the 2.7 dB noise figure region at 4 GHz you are out of bi-polar transistors and into GaAs-FETs in one big and expensive jump.

A small but dedicated group of people are now building kits and modules for this field of experimental terminal builders. A chap in Illinois makes an innovative 16 foot laminated pine backframe for the antenna as a 'kit' and well known amateur microwave author Paul Shuch (N6TX) offers a line of receiver and LNA modules. I expect to see a great deal of equipment, circuit and kit development in this area during 1979.

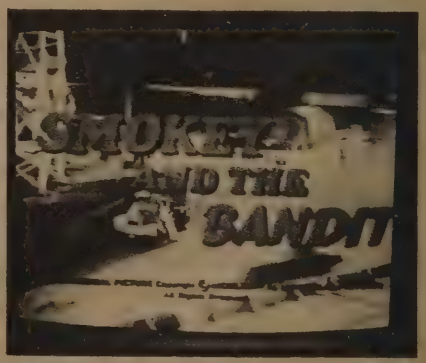
Today if you have access to the 4 GHz test equipment and known how to use microstrip parts and small components you can put together a full blown backyard terminal for between $1,000 and $1,500. One friend of mine, Steve Birkill (G8AKQ) in Sheffield, England has pioneered international (INTELSAT) satellite reception which brings me back to the 20 foot dish in my side yard. When you tire of looking at U.S. or Canadian birds you can swing east in the eastern half of the USA and west in the western half and look down close to the horizon for the INTELSAT satellites that regularly relay TV programs between Europe and (1) Africa, (2) South America and (3) North America (or throughout the Pacific to the west). Birkill also receives the Russian geostationary bird at his English home and regularly switches between Moscow TV and Buenos Aires or the Sudan in just moments time.

This past summer my English friend Birkill and a group of enthusiasts (including Tony Bickel, K5PJR who holds one end of the world's amateur 5.9 GHz record) set up a 'transportable' 11 meter (36 foot) transmit earth terminal here in Oklahoma. For two days we televised via satellite around 15 hours of cable TV industry technical meetings (many dealing with satellite reception) via RCA F1 to hundreds of cable TV receive terminals from coast to coast and border to border. This was the first such 'experiment' with a field unit. This has 'matured' now to my producing a one hour program each week which is sent via RCA F1 every Thursday at 12 noon eastern to nearly 1,000 cable (and related) receive terminals. In that program (appropriately called 'SATELLITE MAGAZINE' which is patterned in format after 'Sixty Minutes') we discuss and describe the latest in satellite television technology. If you live in a town with Home Box Office (HBO) service via satellite, in either the eastern or central time zones, you can probably catch the program on Thursday on your HBO channel at 12 noon eastern or 11 AM central. This is before normal HBO service begins.

Obviously I have only touched on the very top of the 'data pile' you need to dig into if you are interested in getting into this lunacy. For those who think they are interested in learning more, there is a $10.00 'Satellite Study Packet' available from CATJ Magazine, Suite 106, 4209 NW 23rd, Oklahoma City, Oklahoma 73017. Paul Shuch at Microcomm (14908 Sandy Lane, San Jose, California 95124) also has a nifty application note (number 3) which he will send out describing not only satellite TV reception but MDS and ITFS (microwave) reception as well. Please enclose a stamped, self addressed envelope when asking for Paul's application note.

In closing let me note that having direct satellite reception in our home has changed our life style considerably. My two youngsters prefer Canadian TV cartoons to US cartoons; my wife prefers Las Vegas and Parisian nightclub acts (uncut, uncensored and sometimes quite 'R' rated) to Laverne and Shirley and the old man (that's me) likes being able to stay home and still select between 15 to 20 first run, uncut, no commercial movies on any night of the week. From live soccer from Brazil and bullfights from Mexico City, to the latest weather for Inouvik in the Canadian NWT it's all on the satellite!

Snow covered 20 foot (6 meter) dish at W5KHT is prime focus feed on polar mount. Towers in background are part of HF and VHF system at W5KHT/N5AVC.

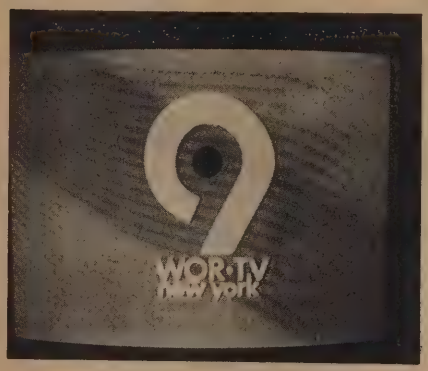



WOR New York after 46,000 + mile path through space and received in

Oklahoma. Station is one of the non-network "indies" carried on satellite (this one is on WESTAR II at 123.5 degrees west).

Six and Twenty—Side view of small 6 foot antenna (directed at WESTAR I) with larger 6 meter antenna in background. Small dish rear mounted on large dish polar mount stand is 4 foot for 10.25 GHz; used to feed TV over a five mile path to a neighbor ham.

W5KHT making measurements. Video monitor, TVRO receiver and signal level meter connected to six foot dish while Bob Cooper does comparison tests between several LNA devices on the 'marginal' six foot antenna.



Ten footer on a flatbed—one way to show off service is to mount 8 or 10 foot parabolic on truck or trailer and haul it around. That's Tony Bickel (K5PJR) of 5.9 GHz fame on bottom in center. Bickel is pioneer in this service, has completely homebrew system.

On the box tonight—With 5 separate 'pay cable' movie channels on SATCOM 1, programming 8 total channels between them private terminal operator has widest possible choice of first run, uncensored movies in America today. This is from SHOWTIME.

## TXA5-2 ATV EXCITER

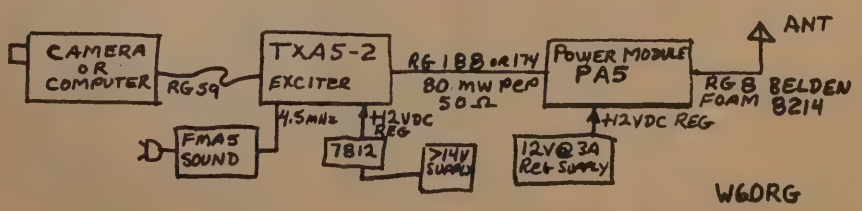
The TX-A5-2 ATV Exciter was designed to drive the Motorola MHW-710-1 power module to 10 watts pep output with 80 MW drive.

Unlike other exciters it will do it (PA5) directly with no attenuator or instability. To keep any multiplier RF out of the TV and 2 meter FM receivers the exciter uses a 108.5 MHz rock (international crystal, $9.40, 10 N. Lee, Oklahoma City, OK 73102 . . . 405-236-3741). Included on the exciter is a high resolution (8 MHz bandwidth) video modulator with DC restoration to insure black blacks and maximum power on sync tips regardless of picture contrast. Provision is also made for addint audio subcarrier with the FMA5 module.

Tuning can be done with just a voltmeter. Just peak for maximum DC voltage on each emitter after the oscillator. When properly tuned the final emitter runs about .3V. The two output trimmers can be peaked into the power module for maximum powermodule current. You may have to adjust the modulator bias such that the total current stays below 2.5 amps.

ATV requires a good regulated supply for transmitters as any ripple on the B+ will show up in the picture or cause instability. A 7812 IC regulator is a good choice for the power supply. Current requirement is 70 MA for the TXA5-2. Keep all connections in coax with the center conductor out of the shield for no more than ¼ inch.

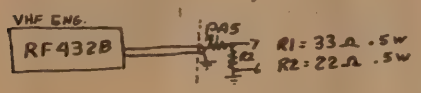
Before connecting the camera video, adjust the modulator bias pot for 10 watts RF output. If more output power is run, the non linear gain curve of the power module will compress the sync and blacks. Connect up the camera and adjust the video gain pot until the whites bloom out in the picture. Do not believe your own received picture as it may be falso from overload. Have another station talk your picture in over 2 meters. If you have a scope this point is about +1V peak at the 2N2219 emitter.



## PA5 10W UHF ATV LINEAR

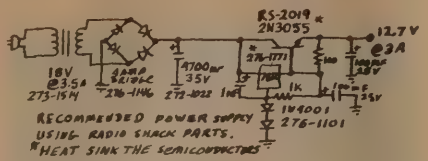
The PA5 power module is built around the motorola MHW-710-1 hybrid. For ten watts output only 80 milliwatts input is required. This module is very reliable and will withstand high VSWR, but there are operating restrictions that must be respected. The TXA5-2 was designed to drive this unit directly. If a VHF engineering or other exciter is used the input must be attenuated with resistors to input to the hybrid.

At UHF extremely short leads must be used so that resistors do not become inductors. Do not exceed 1/4" long, especially the length of the center conductor out of any coax.

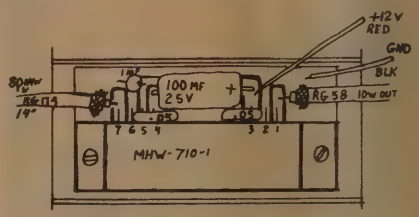



The PA5 must have a well regulated 12 to 14 VDC with leads no longer than 18". If more than 15 volts are applied the hybrid will destroy itself. Also the heat sink supplies must be kept in free air. Do not put it inside a box or cabinet. The hybrid is only covered with epoxy and no RF shielding. Therefore keep some distance from the exciter or place a shielf barrier between them.

The hybrid is capable of 15 watts but it is not linear above 10 watts. Overdriving past 10 will only result in sync and black compression and received sync instability. If more power id desired it can best be had by getting lower loss coax or better antennas rather than risking destruction of the hybrid. (They don't glow cherry red like a tube before they blow).




To set up, adjust the bias pot on the TXA5 for 10 watts out of the hybrid with the camera disconnected. This sets peak power. If you do not have a power meter, 10 watts draws about 2.8 amps at 12 volts. Connect camera and increase video gain to about 7 watts average output (2.3 amps). Then have a distant station talk in the fine adjustment. Try to tune your antenna system to better than 1.5:1 VSWR. MHW-710-1 can be purchased from Hamilton, cod (213-5582000).



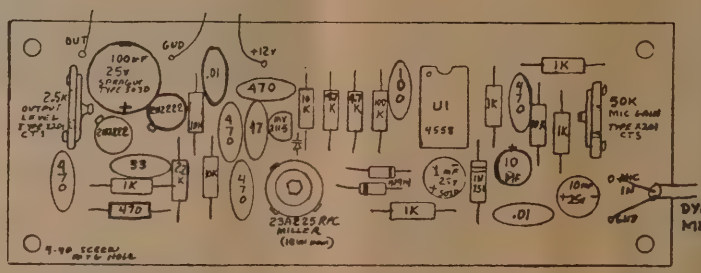

## ATV SUBCARRIER SOUND GENERATOR

This module will enable putting voice on with camera video. It is designed to connect directly to the VM-3 video modulator, or in any 75 ohm video coax line with the addition of a 4.5 MHz trap. The trap, as shown below, is necessary to isolate the capacity of the long coax from the FM-A5 output. The capacity would act as a bypass to 4.5 MHz without the trap.

The output is adjustable to match the camera video level. Nominal subcarrier level is .5 Vp-p to 1 volt of video. However there may be other bandpass attenuation in the transmitter and modulator that would require more adjustment.

The osc. should be adjusted to within 10 KHz. Have the receiving station tune to the high freq side to best receive your sound with the picture. Peak your transmitter also to the high side.

The mic amp has lots of gain such that most mics at full gain will pick up to 20 feet for hands off audio. However at this sensitivity the module must be carefully shielded to prevent stray pickup of video, RF, or 60 hz hum. Any low Z dynamic mic can be used. Frequency response is rolled off past 300 to 3000 HZ for best voice communications. Deviation is fixed at 25 KHz broadcast standard.




## VIDEO DETECTOR/MONITOR

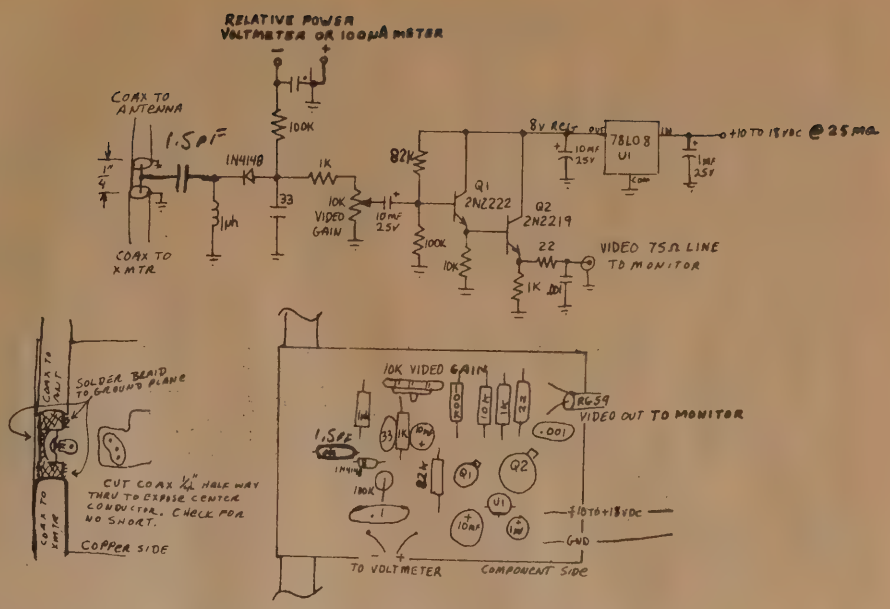
The DM-1 module will give a relative power indication for transmitter tune up or monitoring, and also demodulate and drive a video monitor. The unit taps off the antenna coax line.

Receiving your own transmitted signal on your TV may give a false indication of your actual transmitted picture quality due to front end overload and reflections. By sampling the signal that goes up to the antenna and detecting it and then putting it into the monitor will show what is really going out on the air.

Take extra care when connecting up to the coax. Cut a U shape anywhere along the line no longer than ¼ inch long. Expose the braid for another ¼ inch on each side of the cut. Place the coax against the copper side of the board as shown below. Carefully solder the braid to the

ground plane. Do not over heat and melt or deform the dialectric. Solder a short direct jumper from the coax center conductor to the solder pad. All these connections must be short and neat to minimize vswr.

Any VOM or a 100 microamp meter can be used for the relative power indicator. Other than the 1.5p the 100K resistor inseries with the meter — output can be varied from 22k to 1 meg and calibrated against a calibrated power meter into a dummy load.

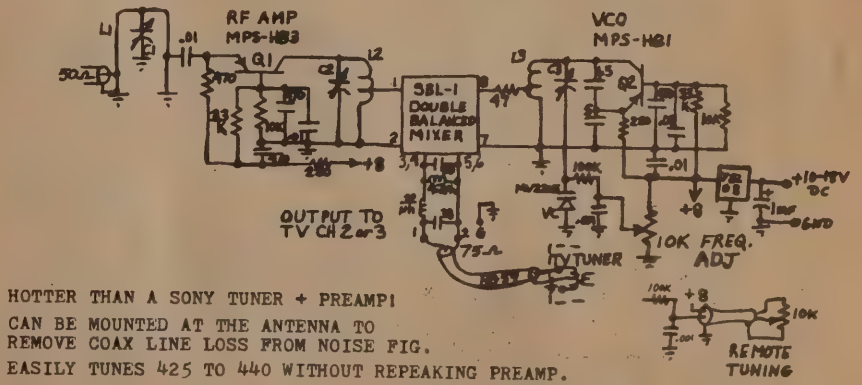


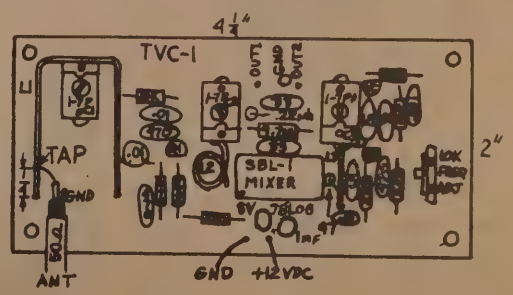

## ATV CONVERTER TVC-1

The TVC-1 ATV converter will enable receiving fast-scan ATV in the 420 to 450 MHz band by mixing the signal down to the TV channel 2 or 3. This module comes pretuned and ready to connect into your ATV system.

The circuit consists of: a low noise, high gain RF amp, a double balanced mixer for wide dynamic range and low inter-mod, and a varicap tuned VCO to enable remote tuning if desired.

The module should be mounted with 4-40 screws and spacers in a shielded chassis or enclosure. 50 ohm coax from the T/R relay or antenna is connected to ground and tapped up L1 where solder can be seen on the wire. Connect up a regulated +12 VDC @ 30 MA. The +12 must be turned off during transmit. Take **special caution connecting** to the **TV tuner**. If your set does not use a power transformer, the chassis may be hot. You could get a shock and blow fuses if the TV set is hot to the AC line and the antenna for ATV is grounded. Either use an isolation transformer in the AC line, or take great care to keep the channel 2-3 output away from the TVC-1 ground. The mixer output is isolated. Use 75 or 50 ohm coax to the tuner. Connect the coax shield to tuner ground and the center to one of the previous twin lead connections. Leave the other twin lead connection open. Fine tune the unused channel 2 or 3 in your area until any commercial TV reception is minimized. Connect ATV antenna and adjust pot for a nearby station. Fine adjust C1. Once C1 is adjusted, it will be good for ± 10 Mhz tuning. The 10K freq pot may be replaced and shielded cable run for remote tuning if desired.

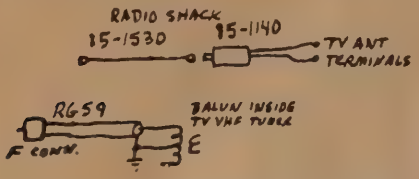


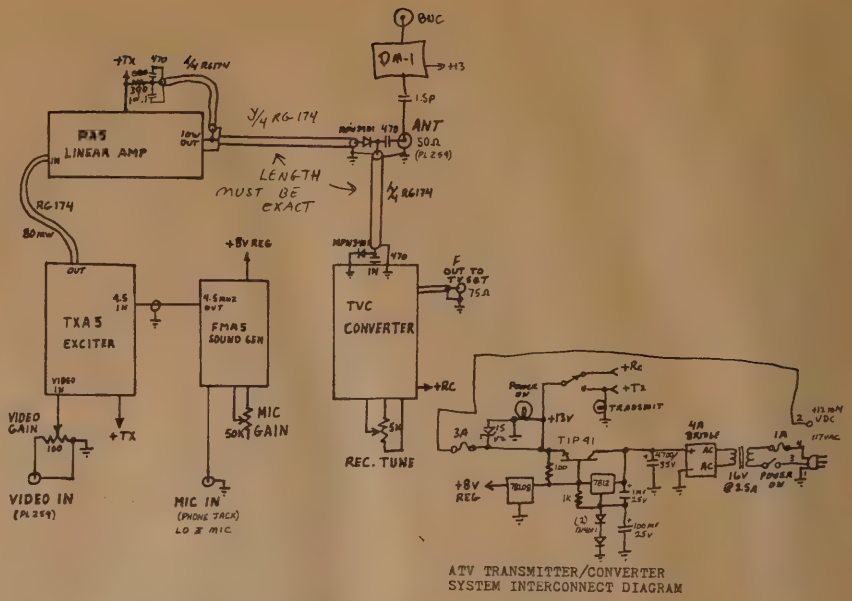
## CONNECTING IT ALL TOGETHER

CAUTION! Make sure your TV set chassis is not hot to ground before connecting up to this unit. Connectors and small coax is available from Radio Shack. Use only good low loss coax to the antenna such as Belden 8214. Be careful not to short out isolated screws on rear panel.

Two methods of connecting to TV set VHF tuner.




DIRECT CONNECTION IS BEST




TC-1/DC

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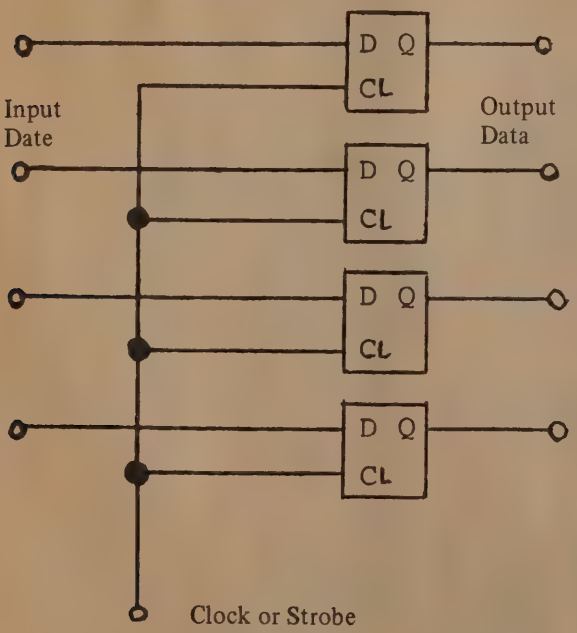
## DIGITAL DESIGN FOR BEGINNERS
## PART 6. CONCLUSION

### 9.0 FLIP FLOP APPLICATIONS

#### Latch

A latch is one or more flip flops used to capture and hold data in a parallel manner on command.

Typically, some form of D type flip flop is used:

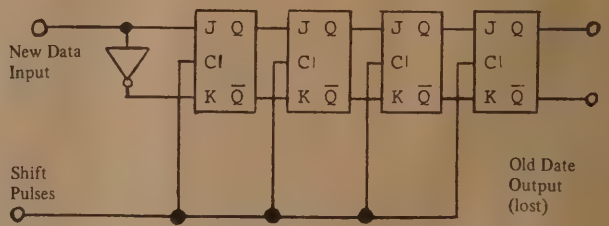



The common clock line is strobed at the time input data is to be sampled. The date is entered into the latches and indefinitely held for output availability. Each time the clock line is strobed, the data is the latches will conform to the input data.

Typically, four such flip flops are available in a single mocrocircuit dual-in line-package (DIP).

#### Shift Register

A shift register is a series of flip flops in cascade, interconnected to permit binary information to be shifted from one flip to flop to the next on command from a shift pulse.




Shift registers are used to transfer data serially one bit at a time.

They are also used as digital delay devices. The "old data" is delayed by the number of stages times the period of the shift pulse.

Many variations can be developed including such techniques as parallel input/serial output, serial input parallel output, and looping output back to input.

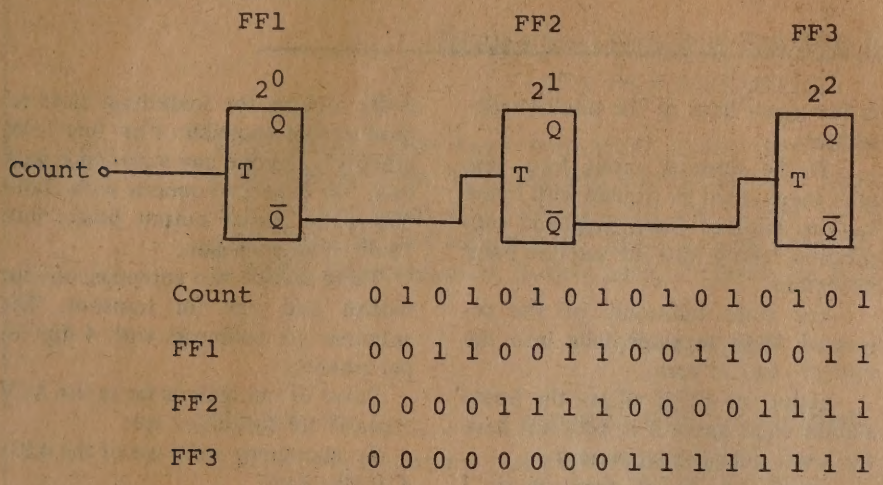
#### Counters

A counter is a series of flip flops interconnected to permit counting of input pulses. Because flip flops are

bistable devices, the count is performed in the binary numbering system.

**Asynchronous Counters**

The simplest type of counter is the asynchronous (fipple or serial) counter.

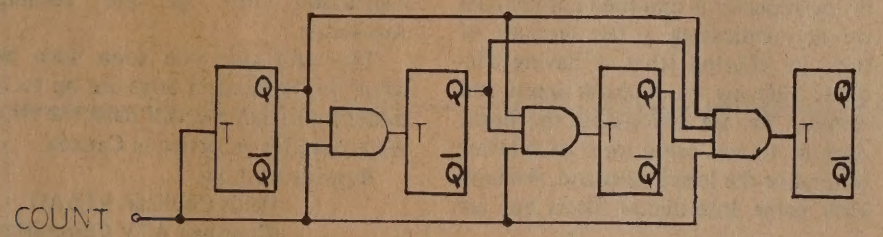



| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Count | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| FF1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| FF2 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| FF3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

It is so designated because the count ripples through the counter. All actions do not occur simultaneously. For example, FF2 cannot change until FF1 has changed.

**Synchronous Counter**

The second type of counter is the synchronous or parallel counter. It is so designated because all count actions




occur simultaneously. The truth table for the synchronous is the same as that for the asynchronous.

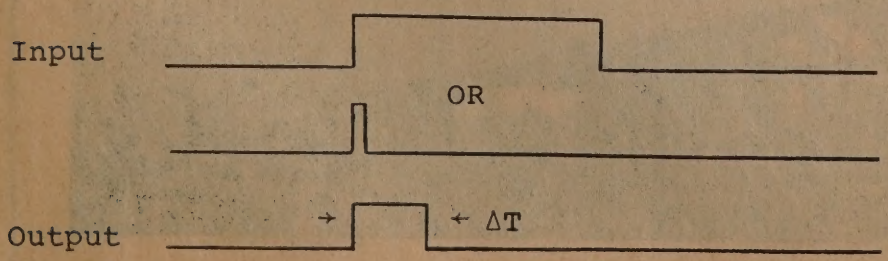
The synchronous counter is faster than the asynchronous and does not generate transitional counts during switching times. Its primary disadvantage is increased hardware.

It should be noted that each succeeding stage in a binary counter produces half the frequency of the preceding stage.

The capacity of any given binary counter in $2^n$ where n is the number of flip flop stages. Additional counts beyond capacity will merely cause the counter to cycle to zero and begin counting again.

Counters can be designed toreset at any value within its capacity. Counters can also be designed to count down as well as up. Bidirectional counters count either up or down as determined by direction control logic.

**Monostable Multivibrators**




**Miscellaneous**

a) **Austable Multivibrators** are oscillators used in digital systems to provide basic clock pulse trains.

b) **Monostable Multivibrators** are digital elements which generate a single output pulse when driven by an input level transition of a given direction. Operations is nearly independent of input signal duration.

The output pulse width is adjustable by an external capacitor and resistor. Most monostables or "one shots" have complementary outputs.

Great care should be exercised in using one shots due to extreme noise susceptibility.

c) **Inverts** are commonly used in digital circuit design to provide the correct signal level for logic operations.

Typically, six inverters are available in a single DIP.

d) **Drivers** are semiconductor devices used to provide sufficient power to control a large load such as a light, relay, or transmission line.

A wide variety is available.

This, then, completes a description of the basic elements of logic mechanization.

Modern semiconductor manufacturers have provided a wide variety of circuit functions in convenient-to-use modular form. The list is long and in a continual state of growth.

Nevertheless, these new functions are merely extensions of the basic logic elements summarized in this text.

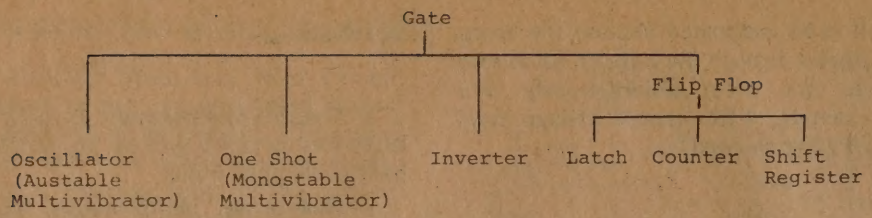
## 10.0 SUMMARY

The foregoing presentation has been compiled to give the student an introductory exposure to basic digital logic.

Although a digital system can become very complex, and hence, very powerful; it nevertheless remains exceedingly simple in principle. Indeed, inherent simplicity is one of the primary advantages of a digital system. All operations ultimately can be reduced to one or more of the three basic logic functions: **"and, or not"**.

Similarly, the devices that perform these functions are relatively few in basic type and simple in operation.

**(continued)**




It was the intent of this presentation to communicate in a practical and straight-forward manner. It is hoped that the student will build upon this foundation and find valuable satisfaction utilizing the concepts learned.

**(continued in next issue)**

---

8728 152A AVE
Edmonton Alberta
March 08/78

Dear Sir;

I enjoy your A5 magazine. I am particularily interested in ATV for as you know (from VE6AN) we are building an ATV repeater in the Edmonton area. I will give you some of the details.

The ATV group are a part of the Northern Alberta Radio Club which has a membership of 200 people. Repeater output frequencies are 439.25 video and 443.75 audio. The input is at 427.0 video and 431.5 audio. The repeater will operate under the call VE6HM and will be co-located at the existing VHF repeater site. Some of the reasons for choosing these frequencies were:

–the repeater output would be clean and with the vestigdual filtering the output would be down 30 db below the carrier at 438.0 mhz. 438.0 is the upper limit of the satellite allocations.

–If the repeater input freq. was high there could be trouble with home stations without lower sideband suppression falling into the satellite band allocation.

–the third harmonic of the co-located VHF repeater falls into the 439.25 - 443.75 band.

–input on 427.0 allows the home station some space if it does not have the lower sideband suppressed.

–input on 427.0 gives us or I should say, may be a potential problem with interference with the 432.0 boys who are active in the area.

Most of the equipment being used in the repeater is modified commercial we are dedicating a fair amount of time to filtering (that is having adequate filtering on repeater input and output. We are advocating the home stations to use some form of filtering to remove the lower sideband. We have built some Interdigital filters but are really looking for something more reproduceable (possible strip line techniques) – anyone any experience with such. We expect to operate with about 200 watts carrier output power into 10 db of antenna gain.

There will be two antennas, one for receive and one for transmit. The antennas are collinears with 4 dipoles per antenna.

Some of our aims as far as the ATV repeater are concerned are:

To encourage more use of the 420 - 450 Mhz band

To allow more Amateur experimentation in the UHF spectrum and especially in wide band signals.

Make use of the repeater for theory instruction for up and coming Amateurs.

This will give you some idea of what the Edmonton boys are up to. I understand that we will have the first ATV repeater in service in Canada.

Regards for now.

Denis Coolican VE6AQ
Chairman ATV Committee

---

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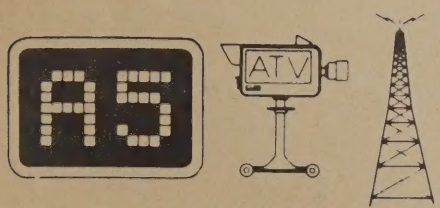


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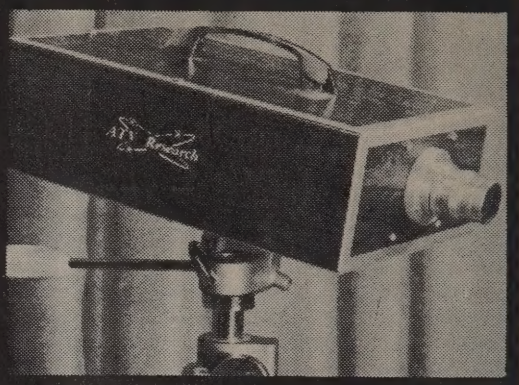

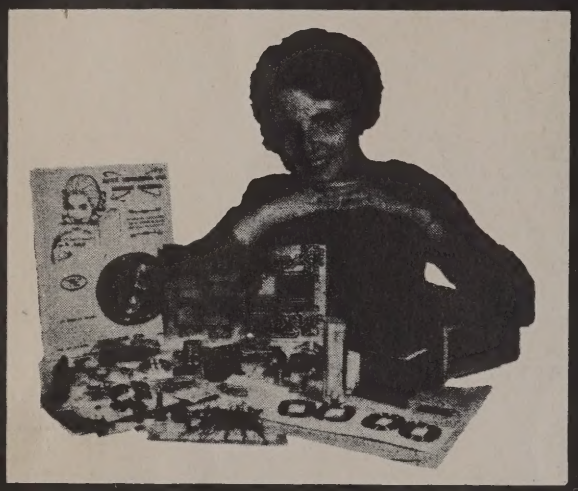

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